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WAR DEPARTMENT.

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

AUGUST, 1885.

PREPARED UNDER THE DIRECTION OF
BRIG. & BVT. MAJ. GEN'L W. B. HAZEN,
CHIEF SIGNAL OFFICER OF THE ARMY,

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List of merchant marine steam and sailing vessels from which International Simultaneous Meteorological reports were received at the Office of the Chief Signal Officer, U. S. Army, Washington, D. C., in time to be used in the preparation of the Weather Review for the month of August, 1885.

	Name of vessel.	Observers.
	Allan Line.	
Br.	s. s. Circassian	Capt. Wm. Richardson.
	Grecian	C. E. Le Gallais.
	Prussian	A. McDougall.
	Scandinavian	John Park.
	Siberian	R. P. Moore.
	American Line.	
Br.	s. s. British Crown	Geo. Burton.
	British Prince	Sam. Nowell.
	British Princess	E. H. Freeth.
Am.	Indiana	R. W. Sargent.
Br.	Lord Clive	P. Urquhart.
	Anchor Line.	
Br.	s. s. Anchoria	J. J. Small.
	Australia	Alex. McRitchie.
	City of Rome	R. D. Munro.
	Elysia	James Brown.
	Ethiopia	John Wilson.
	Italia	Thos. Craig.
	Anglo-Australian S. S. Co.	
Br.	s. s. Port Phillip	Geo. Dulling.
	Atlas Line.	
Br.	s. s. Ailsa	J. W. Sansom.
	Alvo	David Williams.
Span.	Andes	D. de Amézaga.
	Athos	Horatio Low.
Br.	s. s. Claribel	T. M. McKnight.
	Booth's S. S. Co. (limited).	
Br.	s. s. Clement	Thomas Burley.
	Cyril	J. H. Johnson.
	Bristol City Line.	
Br.	s. s. Brooklyn City	W. Fitt.
	Llandaff City	T. H. Gore.
	Canada Shipping Co.	
Br.	s. s. Lake Nepigon	M. L. Tranmar.
	Cunard Line.	
Br.	s. s. Aurania	W. H. P. Hains.
	Bothnia	T. Roberts.
	Catalonia	Alex. McKay.
	Cephalonia	Henry Walker.
	Etruria	T. Cook.
	Gallia	M. Murphy.
	Pavonia	B. Woolfenden.
	Scythia	P. Whealan.
	Servia	W. McMickan.
	Edward Carr's S. S. Line.	
Ger.	s. s. Australia	G. Franck.
	Europa	L. A. Kessal.
	India	I. I. von Holdt.
	Furness Line.	
Br.	s. s. Durham City	M. P. Lund.
	Ripon City	Ch. Off. Jas. Mansfield.
	Stockholm City	Capt. K. Doyle.
	General Trans-Atlantic Steamship Co.	
Fr.	s. s. Canada	G. de Kersabiec.
	St. Laurent	M. de Jousselin.
	Great Western S. S. Line.	
Br.	s. s. Dorset	Wm. Stamper.
	Guion Line.	
Br.	s. s. Nevada	John Douglas.
	Wyoming	C. L. Rigby.
	Wisconsin	Edward Bentley.
	Hamburg-American Line.	
Ger.	s. s. Bohemia	R. Karlowa.
	Frisia	E. Kopff.
	Hammonia	H. F. Schwensen.
	Lessing	B. Voss.
	Moravia	O. Pezoldt.
	Rhaetia	H. Vogelgesang.
	Rugia	A. Albers.
	Suevia	C. Ludwig.
	Wieland	C. Hebich.
	Westphalia	H. Barends.
	Inman Line.	
Br.	s. s. City of Berlin	Francis S. Land.
	City of Chicago	Fred Watkins.
	City of Richmond	A. W. Lewis.
	Johnson Line.	
Br.	s. s. Nessmore	John Inch.
	Lampert & Holt's Steamship Company.	
Br.	s. s. Bessel	Chas. J. Watson.
	Biela	Fred Graham.
	Heveliue	John Carroll.
Belg.	Hipparchus	Wm. Kelly.
Br	Dalton	J. Russell.
	Donati	John P. Bevis.
	Euclid	Alex. W. Pym.
	Sirius	W. H. Stapledon.
	Leyland Line.	
Br.	s. s. Venetian	W. H. Trant.
	Virginian	M. Fitt.
	Liverpool, Brazil and River Plate Steam Navigation Company.	
Br.	s. s. Olbers	James Clarke.
	Mallory Line.	
Am.	s. s. Alamo	Sam. Risk.
	Lampasas	M. B Crowell
	San Marcos	A. C Burrowe.
	Mediterranean and New York S. S. Co.	
It.	s. s. Stura	Joseph Brofferio.

	Name of vessel.	Observers.
	Miss. & Dominion S. S. Co.	
Br.	s. s. Ontario	Capt. W. P. Couch.
	Toronto	Jas. McAuley.
	Monarch Line.	
Br.	s. s. Assyrian Monarch	John Harrison.
	Grecian Monarch	B. J. W. Bristow.
	Morgan's La. & Texas R. R. & S. S. Co.	
Am.	s. s. Chalmette	Robt. B. Quick.
	National Line.	
Br.	s. s. Canada	Wm. Pearce.
	Denmark	R. S. Rigby.
	Greece	Thos. Foote.
	Holland	Wm. Tyson.
	Spain	W. A. Griffiths.
	Navigazione Generale Italiana.	
It.	s. s. Archimede	Domenico Viola.
	Indipendente	P. Pirandello.
	Gottardo	G. Diliberto.
	New York and Cuba Mail S. S. Co.	
Am.	s. s. Cienfuegos	C. M. Faircloth.
	N. Y., Havana & Mexican Mail S. S. Co.	
Am.	s. s. City of Alexandria	J. W. Reynolds.
	North German Lloyd Steamship Co.	
Ger.	s. s. America	G. Meyer.
	Donau	C. Pohle.
	Eider	H. Heimers.
	Ems	W. Willigerod.
	Fulda	R. Ringk.
	Hermann	H. Baur.
	Main	H. Christoffers.
	Neckar	F. Pfeifer.
	Salier	C. Wiegand.
	Occidental and Oriental Steamship Co.	
Br.	s. s. Arabic	W. G. Pearne.
	Oceanic	John Metcalfe.
	Ocean Steamship Company.	
Am.	s. s. City of Augusta	K. S. Nickerson.
	Oceanic Steamship Company.	
Am.	s. s. Alameda	H. G. Morse.
	Oregon Railway and Navigation Co.	
Am.	s. s. City of Chester	Thomas Wallace.
	Columbia	Fred Bolles.
	Oregon	E. Polemann.
	Geo. W. Elder	H. S. Ackley.
	Pacific Coast Steamship Company.	
Am.	s. s. Mexico	T. Huntington.
	Orizaba	John N. Ingalls.
	State of California	G. Debney.
	Santa Rosa	C. B. Johnson.
	Pacific Mail Steamship Company.	
Am.	s. s. City of New York	R. R. Searle.
	City of Para	L. Dexter.
	City of Peking	G. G. Berry.
	City of Rio Janeiro	Wm. B. Cobb.
	City of Sydney	H. C. Dearborn.
	San Blas	Thos. Chapman.
	San José	A. D. Austin.
	Zealandia	Henry Webber.
	Quebec Steamship Company.	
Br.	s. s. Muriel	G. S. Locke.
	Orinoco	Jas. S. Garvin.
	Red "D" Line.	
Am.	s. s. Caracas	W. M. Hopkins.
	Philadelphia	Sam. Hess.
	Red Star Line.	
Belg.	s. s. Belgenland	W. A. Beynon.
	Nederland	Allen J. Griffin.
	Pennland	Rud. Weyer.
	Rhynland	J. C. Jamison.
	Switzerland	H. Buschmann.
	Waesland	J. Ueberweg.
	Westernland	Com. W. G. Randle.
	Rotterdam Line.	
Dtch.	s. s. Edam	Capt. J. H. Taat.
	Leerdam	P. Stierendregt.
	P. Caland	T. H. Bonjer.
	W. A. Scholten	G. J. Vis.
	Zaandam	A. Potjer.
	Royal Mail Steam Packet Company.	
Br.	s. s. Minho	W. Chapman.
	State Line.	
Br.	s. s. State of Georgia	G. Moodie.
	State of Nevada	John A. Stewart.
	State of Pennsylvania	Alfred Mann.
	Thingvalla Line.	
Dan.	s. s. Geiser	F. V. Schierbeck.
	Hekla	A. G. Thomsen.
	Island	W. Skjodt.
	Thingvalla	S. T. H. Laub.
	U. S. and Brazil Mail S. S. Co.	
Am.	s. s. Advance	Jas. R. Beers.
	Finance	Ch. Off. James Lord.
	Warren Line.	
Br.	s. s. Iowa	Capt. Samuel Walters.
	White Cross Line.	
Dtch.	s. s. De Ruyter	J. J. Brarens.
Belg.	Jan Breydel	H. Meyer.
	White Star Line.	
Br.	s. s. Adriatic	H. Parsell.
	Baltic	R. E. Bence.
	Britannic	H. Perry.
	Celtic	Benj. Gleadell.

	Name of vessel.	Observers.
	***White Star Line*—Continued.**	
	Germanic	Capt. C. W. Kennedy.
	Republic	P. J. Irving.
	Wilson Line.	
Br.	s. s. Chicago	J. W. Jones.
	Marengo	J. H. Malet
	Otranto	F. Kerr.
	Winsor Line.	
Am.	s. s. Norman	H. W. Googins.
	Saxon	S. W. Snow.
	Miscellaneous.	
Ger.	s. s. Brutus	J. A. Voege.
Br.	Edith Godden	John H. Bennett.
	Glenochil	Robert Hay.
Am.	Lorenzo D. Baker	W. F. Wiley.
Br.	Menzaleh	J. B. McKie.
	Monte Rosa	W. T. Irving.
Fr.	Nenstria	P. Verriers.
Br.	Picqua	William Clayton.
	Prydain	Moses Parry.
Ger.	Raiatea	J. Vioreck.
Br.	Rydal Water	J. H. Jones.
Span.	Valencia	Ch. Off. J. A. Estopiña.
	"New York Herald Weather Service."	
Am.	s. s. Acapulco	Capt. W. G. Shackford.
Br.	Adriatic	H. Parsell.
	Ailsa	J. W. Sansom.
	Albano	H. R. Hughes.
	Alene	E. J. Seiders.
	Alvo	D. Williams.
	Aurania	W. H. P. Hains.
	Baltic	Robt. E. Bence.
Belg.	Belgenland	W. A. Beynon.
Br.	Bothnia	Thos. Robers.
	Britannic	H. Perry.
	Celtic	Benj. Gleadell.
Am.	Chalmette	Robt. B. Quick.
	City of Alexandria	J. W. Reynolds.
Br.	City of Berlin	Francis S. Land.
	City of Chicago	Fred Watkins.
	City of Chester	H. Condron.
Am.	City of Puebla	John Deaken.
Br.	City of Richmond	A. W. Lewis.
Am.	Colon	Chas. C. Lima.
	Crescent City	Jas. L. Lockwood.
Ger.	Elder	H. Helmers.
Br.	Elysia	James Brown.
Ger.	Ems	Ch. Leist.
Br.	Gallia	M. Murphy.
Dan.	Geiser	F. V. Schierbeck.
Br.	Ivanhoe	John Cameron.
Ger.	Lessing	B. Voss.
Dtch.	P. Caland	T. H. Bonjer.
Belg.	Pennland	R. Weyer.
Br.	Republic	P. J. Irving.
Belg.	Rhynland	J. C. Jamison.
Am.	San Marcos	Ch. Off. A. B. Conner.
	Saratoga	Capt. John McIntosh.
Dtch.	Schiedam	G. Bakker.
Br.	Servia	W. McMickan.
Fr.	St. Laurent	M. de Jousselin.
Br.	State of Georgia	Geo. Moodie.
Belg.	Switzerland	H. Buschmann.
Dtch.	W. A. Scholten	G. Bakker.
Belg.	Waesland	J. Ueberweg.
	Westernland	Com. W. G. Randle.
Br.	Wisconsin	Capt. Edw. Bentley.
	Wyoming	Chas. L. Rigby.
Dtch.	Zaandam	J. de Hamecourt.
	Sailing vessels.	
Am.	bg. Abbie Clifford	D. W. Storer.
	sc. Abbie H. Ghoen	W. W. Ghoen.
Ger.	sp. Agra	A. Hogemann.
Am.	bk. Antonia Sala	F. H. Mitchell.
It.	Angela Schiaffino	Enrico Schiaffino.
Br.	sp. British Isles	G. Southcott.
	bk. Corisande	Daniel Thoms.
Ger.	sp. Derby	B. Fortmann.
	Dora	H. Meyer.
Br.	E. J. Spicer	Dewis Spicer.
Am.	bkt. Emily Shepard	E. Coggins.
	sc. Ettie H. Lister	Smith D. Mason.
Br.	bk. Exile	Geo. J. Pearce.
Am.	sc. Florence Rogers	J. S. F. McLeod.
Dan.	bk. Galeon	H. H. Kalsboll.
Am.	sc. Governor Hall	John Craig, jr.
Ger.	sp. Hedwig	Th. Minssen.
	bk. Heinrich & Tonio	L. Myer.
Am.	sp. Henry Villard	F. B. Perkins.
	bk. Idaho	W. S. Richardson.
Ger.	Jacob	Adolph Linder.
Am.	sc. James H. Gordon	W. Lawrence.
	James Slater	James L. Tooker.
Ger.	bk. Leocadia	John Stohff.
Am.	bkt. Levanter	A. S. Vesper.
	bg. L. & W. Armstrong	A. Alexander.
Br.	Lilian	H. F. Schive.
Am.	Mary Fink	D. B. Darrah.
	bk. Mohican	B. F. Berry.
	bkt. Payson Tucker	Charles Brown.
Nor.	bk. Qvos	Gunder Olsen.
Am.	Sarah Doe	B. S. Merryman.
	sc. Sarah D. J. Rawson	Thos. D. French.
Br.	bk. Sodium	Alex. Wilson.
Am.	sc. Stephen Bennett	William Douglas.
Br.	bk. Strathbome	A. W. Flemming.
Nor.	Tros	Severin Brager.
Ger.	sp. Union	H. Fokken.
	bk. Western Chief	Fr. Sander.

MONTHLY WEATHER REVIEW.

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INTRODUCTION.

This REVIEW contains a general summary of the meteorological conditions which prevailed over the United States and Canada during August, 1885, based upon the reports from the regular and voluntary observers of the Signal Service and from co-operating state weather services.

Descriptions of the storms which occurred over the north Atlantic Ocean during the month are also given, and their approximate paths shown on chart i.

The number of "cyclonic areas" traced on chart i for August, 1885, is seven, the average number for August during the last twelve years being 10.2. That traced as number vi was a tropical hurricane, and caused great damage on the south Atlantic coast. It was most destructive in the vicinity of Charleston, South Carolina, where the damage is estimated at more than $1,500,000.

The most severe and destructive local storms of the month were those which occurred in the middle Atlantic states and New England on the 2d and 3d, during the prevalence of "cyclonic area" charted as number i.

The mean temperature for the month was decidedly below the normal throughout the northern part of the country to the eastward of Idaho; in the south Atlantic and Gulf states it was nearly normal; over the southwestern districts and portions of the plateau and Pacific coast regions it was above the normal.

The precipitation was unusually heavy over the country from Kansas and Nebraska eastward to New England, and on the coasts of South Carolina and Georgia. It was below the average in the extreme northwest; from southern Missouri and Arkansas eastward to the Atlantic coast, and from the east Gulf states westward to the Pacific coast.

Referring to the ice-region of the north Atlantic, reports show that icebergs have drifted farther to the eastward than in the preceding month, while the southern limit is about 1° to the northward of that for July. The small number of icebergs observed, however, indicates that they are rapidly disappearing from the route of trans-Atlantic steamers.

In the preparation of this REVIEW the following data, received up to September 20, 1885, have been used, viz., the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and twenty-nine Signal Service stations and sixteen Canadian stations, as telegraphed to this office; one hundred and sixty-eight monthly journals and one hundred and sixty-three monthly means from the former, and sixteen monthly means from the latter; two hundred and eighty-three monthly registers from voluntary observers; reports from 1,430 special tornado observers; forty-five monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly weather reports from the local weather services of Dakota, Indiana, Iowa, Minnesota, Missouri, Nebraska, Ohio, and Tennessee, and of the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE.

[*Expressed in inches and hundredths.*]

The mean atmospheric pressure for August, 1885, determined from the tri-daily telegraphic observations of the Signal Service, is shown by the isobarometric lines on chart ii.

The mean pressure for the month is least over the central and southern Rocky Mountain districts; it is greatest in the north Pacific coast region and in the districts bordering on the Atlantic and Gulf coasts. The barometric means range from 29.78 to 29.85 in the districts embraced in the area of least pressure, and the highest monthly mean readings, 30.02, are reported from stations in Washington Territory. East of the Mississippi River the mean pressure in all districts ranges from 29.95 to 30.0, except in Minnesota, Wisconsin, and the upper Michigan peninsula, where they are slightly below 29.95.

Compared with the mean pressure for the preceding month, there has been an increase in the northern portions of the country from Idaho eastward to the Atlantic coast, while to the south of latitude 37° N. there has been a decrease in all districts. The increase is most marked from the upper lake region to Montana, where it ranges from .05 to .15. In the districts where a decrease is shown the deficiency ranges from .01 to .05, except along the Gulf coast and in the middle Pacific coast region, where it is somewhat greater.

The departures from the normal pressure at various Signal Service stations are given in the tables of miscellaneous meteorological data, and on chart iv they are exhibited by lines connecting stations of equal departure. A normal line, on the chart named, is traced from the northern boundary of Minnesota southwestward to El Paso, Texas, and thence eastward to Key West, Florida, the departure at the latter station being +.02. To the northward and eastward of this line the departures are below the normal; to the westward they are slightly above the normal, except on the Pacific coast, where a slight deficiency is shown. The greatest deficiencies (from .05 to .08) occur in the lake region, southern New England, middle Atlantic states, and in portions of the Ohio, Mississippi and Arkansas Valleys. The departures above the normal exceed .05 at but two stations, viz., Santa Fé, New Mexico, +.07, and Winnemucca, Nevada, +.06.

MONTHLY BAROMETRIC RANGES.

The monthly barometric ranges at the various Signal Service stations are also given in the table of miscellaneous meteorological data. Except at Charleston, South Carolina, the monthly ranges were greatest in the lake region, where they varied from .68 to .88; they were least in Arizona, the lower Rio Grande Valley and in southern Florida, the smallest being as follows: Fort Grant, Arizona, .13; Fort Apache, Arizona, and Brownsville, Texas, .18; Key West, Florida, .20. The unusually large monthly range (1.44) of pressure at Charleston is due to the hurricane which prevailed there on the 25th, when the barometer fell to 28.73.

ANTI-CYCLONIC AREAS.

There were seven of these areas during August, but none were very remarkable, except number vii, which is more particularly described in connection with cyclonic area number vi. It may be remarked, generally, that the frosts which occurred during the month were nearly twenty-four hours in advance of the crest of the barometric wave, which was denoted by the greatest height above the normal, although they also occurred at the same time with the highest abnormal pressure. One of these areas was a continuation of number ix from the preceding month, and all the others came in from the British Northwest Territory and Manitoba.

I.—This area was a continuation of area number ix in July. On the morning of the 1st it covered Manitoba and the British Northwest Territory, and the barometer was from .10 to .16 above the normal. By the morning of the 2d it was over the provinces of Ontario and Quebec and caused light local rains in its progress in New England, the middle Atlantic states, and in the lower lake region. The fall of temperature accompanying this area was nowhere greater than ten degrees. On the morning of the 3d this area was over the Gulf of Saint Lawrence, with the barometer .20 above the normal.

II.—This area followed the great storm of the 1st and 4th, appearing in Minnesota and Dakota on the morning of the latter date; the gradient was quite steep, and high winds prevailed in the lake regions on the 4th. By the morning of the 5th this area had moved eastward and had covered the upper lake region, with a rise here of from .30 to .50 in the twenty-four hours. Rains preceded this area, but there was no decided fall of temperature. By the morning of the 7th this area had moved easterly over New England. By the morning of the 9th it had commenced to move off the coast of the Canadian Maritime Provinces. This area was followed in its progress on the 6th and 7th by almost general rains in the upper Mississippi and Ohio valleys and in the lake regions. On the 5th there were some fresh winds on the New Jersey coast, due to the anti-cyclonic influence.

III.—This area appeared in the British Northwest Territory on the morning of the 7th; it seems to have moved from the high area that had prevailed for a few days in the north Pacific coast region. It moved in a southeasterly direction until the afternoon of the 10th, when it was central over Lake Michigan. From this time it gradually spread eastward and covered the Atlantic coast states on the 12th. Generally fair weather, with slightly lower temperature, accompanied this area in its progress.

IV.—This area made its appearance on the morning of the 10th, coming, like its predecessor, from the Northwest Territory. On the morning of the 11th it was central in Montana, where it remained without any decided change until the afternoon of the 12th. By midnight of the 13th it embraced the upper lake region and the upper Mississippi and Missouri valleys, and caused brisk winds on the upper lakes on this date. Although this area was not accompanied by any very decided fall in temperature, light frosts were reported in the public press as having occurred on the morning of the 14th in Michigan, Wisconsin, and Minnesota, and in New England, New York, and Pennsylvania on the morning of the 15th; the minimum temperatures reported were from 45° to 55° at most stations in these states during this time. The "New York Tribune" of the 19th spoke of the frost warning that was given on the 13th for Michigan and Wisconsin as particularly valuable, as were the subsequent warnings for New England and New York. By the morning of the 17th this area began to move eastward off the Atlantic coast.

V.—This area appeared in British Columbia on the morning of the 17th; by the morning of the 19th it had moved easterly and was central in the Missouri Valley; by the 20th it had embraced the Atlantic coast states, and moved off the coast on the 21st. It caused high winds on the New Jersey coast on the 19th, but otherwise was not at all remarkable.

VI.—This area also came from the British Northwest Territory and appeared on the morning of the 20th over Montana; it followed closely cyclonic area number v, with crowding isobars, which were a little more open by the morning of the 21st. In the eastward movement of this area it followed the above cyclonic storm, and by the morning of the 23d commenced moving off the Atlantic coast. The general rise of the barometer in the progress of this area was not very great nor rapid, although it assisted in producing the high winds recorded upon the lakes. The fall of temperature was also slight as it moved eastward. The rains in advance of this area were generally local, but not very heavy.

VII.—This area appeared in Manitoba on the morning of the 23d, and gradually extended and increased until the morning of the 28th, when it moved off the coast. This anti-cyclone must be closely studied in connection with cyclonic area number vi.

VIII.—This area appeared in Manitoba on the morning of the 30th and spread gradually southeastward, covering nearly the whole of the country by the midnight report of the 31st. It carried with it generally fair weather, but no decided fall of temperature. It will be further described in the REVIEW for the month of September.

CYCLONIC AREAS.

There were seven cyclonic storms during the month of August, of which six were quite within the limits of the Signal Service stations; one, number iv, passed so far north through Canada that the track of its centre is somewhat doubtful. One, number vi, was the West India cyclone of the 24–26th, and is remarkable for the great force of the wind, and the destruction of life and property, particularly at Charleston, South Carolina. Area number i traversed the country in a northeasterly direction from Arkansas, and was very severe on the northern lakes.

The following table gives the latitude and longitude in which the centre of each area was first and last located, and the average hourly velocity:

Areas of low barometer.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long W.	
	° ′	° ′	° ′	° ′	
No. I	36 00	92 30	52 00	64 30	19.0
II	43 00	102 00	51 30	63 00	27.7
III	45 00	99 00	50 00	62 00	21.0
IV	51 00	103 00	53 00	65 30	24.5
V	49 45	101 30	50 30	60 30	30.0
VI	26 00	79 00	35 15	77 00	*13.8
VII	29 30	89 00	33 30	78 30	18.0
Mean hourly velocity					22.0

* Average velocity from 7 a. m. of 24th to 11 p. m. of 25th.

I.—This area developed in Arkansas on the afternoon of the 1st, with a small, well-defined but not violent storm, whose centre was a little northwest of Little Rock. The morning map of the 1st presented no great contrasts of pressure or temperature. The line of normal pressure ran from near Marquette, Michigan, in a southwesterly direction to Santa Fé, New Mexico; to the east and south of this line the pressure was from .10 to .17 below the normal, while north and west of the line the pressure was slightly above the normal. On the afternoon of the 1st thunder-storms occurred in New England, the middle and south Atlantic states, the lower lake region, the Ohio Valley and Tennessee, and in Arkansas, but there was nothing to indicate any extensive cyclonic storm. By the morning of the 2d the centre had moved northeasterly and was near Springfield, Illinois, with an abnormal fall of the barometer of .22 in the twenty-four hours; light local rains had fallen in all districts where the barometer was below the normal, as stated above. By the afternoon of the 2d the influence of the storm was felt on Lakes Erie and Michigan, and fresh northeasterly winds occurred; at this time the centre was north of Indianapolis, Indiana; the rain-area had increased in extent and it was easy to define the course of the storm. By the

morning of the 3d the pressure over the lake regions, Ohio Valley, and middle Atlantic states was from .30 to .40 below the normal; and, besides a general rainfall, high southeasterly winds prevailed on the New Jersey coast. On the afternoon of the 3d occurred the violent storm in the vicinity of Philadelphia, Pennsylvania, and Camden, New Jersey, which occasioned loss of life and great destruction of property. Six persons were killed and one hundred wounded, and the destruction to property was estimated at half a million of dollars. The winds on the New Jersey coast were from twenty-five to fifty miles an hour. By the afternoon of the 4th the centre of the storm was north-northwest of Montreal, Canada, and at this time high westerly winds were reported on the lower lakes. By the afternoon of the 5th the centre was northwest of Anticosti. During the progress of this storm across the country thunder-storms occurred in nearly all districts, and the rainfall was unusually great. The midnight map of the 5th showed that the storm had passed off the coast of Labrador.

II.—This area appeared on the morning of the 7th with the centre nearly north of North Platte, Nebraska, at which place the barometer was .27 below the normal. By the morning of the 8th the centre was near Omaha, Nebraska, having moved southerly to near West Las Animas, Colorado at the previous midnight, and then northeasterly. On the morning of the 8th the area of lowest barometer was bounded by a long oval stretching from Duluth, Minnesota, to the Pan Handle of Texas. A very heavy rain fell on this date at Yankton, Dakota, and numerous thunder showers in the upper Mississippi and Missouri valleys. By the morning of the 9th the storm was central near Marquette, Michigan, and high winds prevailed during this day on the upper lakes. From this date the centre moved northeasterly until midnight of the 10th, when it was well north of the Gulf of Saint Lawrence. Thunder showers were frequent during the progress of the storm, occurring generally in the quadrant southeast of the centre.

III.—This area appeared on the morning of the 11th, and was central near Huron, Dakota. It moved east-northeast until the morning of the 15th, when it was central over Newfoundland. This storm was characterized by light local rains in its progress, and light winds. On the afternoon of the 12th, when the centre was a little northeast of Marquette, Michigan, there occurred in northern New York a tornado of marked violence, which raged with great fury at Norwood, New York, where several persons were killed, others were injured, buildings blown down, and where there was a heavy fall of rain accompanied by hail. This severe local storm was not indicated by any unusual action of barometer or thermometer. The morning reports in the immediate vicinity showed a slight rise of temperature and a very slight abnormal fall of barometer, so that it was practically unforeseen.

IV.—This area appeared in Manitoba on the morning of the 14th and pursued an easterly course until it passed into Labrador at midnight of the 18th. It was a storm of very slight energy, and its influence was but little felt even in the lake regions; there were some fresh winds on Lake Superior on the 16th, but no damage was reported.

V.—This area also appeared first in Manitoba on the morning of the 19th, but it was not well developed until the midnight of the 20th, when its centre had moved southeasterly and was located near Saint Paul, Minnesota; from here it moved northeasterly and passed to the Labrador coast by midnight of the 22d. On the 21st, during the passage of this storm, high winds prevailed on the Lakes, and heavy rains and thunder-storms were frequent; the rain-area extended to the Ohio Valley and the northern part of the middle Atlantic states. In Chicago, Illinois, on the 21st, lightning struck the building of Oberne, Horick & Co., and destroyed building and stock to the amount of $65,000. The thunder-storm here was very heavy. In other lake cities damage was done by lightning and by the high winds. In Buffalo, New York, where the wind reached a maximum velocity of forty-two miles, the "Western Transit Company's shed was blown down; chimneys, trees, signs, fences, and out-houses, also, throughout the city were injured." The "storm signal flying gave great satisfaction." The order to hoist the signal was received at 10.55 a. m. on the 20th, so that there was an ample warning of nearly twenty-four hours. This storm was described as "the most severe and destructive thunder-storm of the season;" this same remark was made in the abstract of journal of the observer at Rochester, New York.

VI.—This storm was the West India cyclone that visited the south Atlantic coast on the 24th and 25th, and deserves special and particular mention. The morning map of the 23d showed an area of high barometer on the Carolina coast and in Georgia, the barometer being lowest in Colorado, with indications of the formation of a cyclonic storm in the Missouri Valley; an abnormal fall of the barometer of .10 occurred in the upper Mississippi valley, and heavy rains had occurred during the night at Chicago, Illinois, Davenport and Des Moines, Iowa. At Jacksonville and Key West, Florida, light northeast winds had been reported for twenty-four hours. By midnight of the 23d a high area had appeared in Manitoba, with the barometer .10 above the normal, and the cyclonic area extended in a long oval from Colorado to New England, with the barometer from .10 to .20 below the normal. The rain-area was nearly coincident with this low area. The wind was northeast at Jacksonville, Florida, with a fall of .05 in the barometer, and north wind at Key West, Florida, with a rise of .02 in the eight hours. These conditions show how unexpected was the great fall of barometer at Jacksonville, Florida, reported on the morning of the 24th, when an abnormal fall of .15 was reported, with light rain and a fresh wind of sixteen miles. The wind at Key West, Florida, was light northerly, and at Savannah, Georgia, light northeasterly. The long trough continued from Colorado to Nova Scotia, with a high area in the east Gulf states, and the highest barometer in Manitoba. The rain-area continued along the axis of this trough. Fearing that a disturbance might be coming in upon the coast, the Indications Officer called for special midday reports from several of the stations on the south Atlantic coast, upon the receipt of which reports cautionary storm signals were ordered, and notice of the storm was telegraphed to the New York Maritime Exchange. Before the receipt of the order for the cautionary signal at Jacksonville, Florida, the storm itself had already reached there, and the afternoon chart plainly showed the centre of the cyclone to be northeast of this place and south of Savannah, Georgia; at the latter place a brisk northeast wind of nineteen miles, and at the former a gale of forty miles from the west. Perhaps the afternoon charts of the 24th presented some of the most remarkable features ever witnessed, which were about as follows: A West India cyclone was raging on the Georgia coast, with the barometer .30 below the normal, winds increasing in force, and light rains. A long, narrow trough, in which the barometer was .20 to .30 below the normal, extended from northwestern Texas to the Gulf of Saint Lawrence; within this trough were several small depressions bounded by the isobar for 29.70; the barometer was lowest over the Gulf of Saint Lawrence, with the isobar for 29.50 bounding the storm centre; heavy rains and severe thunderstorms marked this trough. The barometer was highest and still rising in Dakota and Manitoba. The temperature was slightly below the normal on the Georgia and South Carolina coast, and was from 5° to 12° above the normal in the southern part of New England, in the middle Atlantic and east Gulf states, the Ohio Valley and Tennessee, and in North Carolina, then again to the north of this region the temperature was from 10° to 20° below the normal.

The midnight map of the 24th showed that the centre of the cyclone had moved slightly northward and was near Savannah, Georgia; 7 a. m. of the 25th it was near Charleston, South Carolina; the afternoon of the 25th it was north of Charleston, South Carolina, and west of Smithville, North Carolina; at midnight it was north-northwest of Wilmington, North Carolina, and west of Hatteras, North Carolina; and by 7 a. m. of

the 26th it had passed off the North Carolina coast near Kitty Hawk, North Carolina. By midnight of the 25th the trough spoken of above had been rapidly filled up, the high area number vi having moved gradually southeastward until the cyclone was forced off the coast, and there was a great rush of cold air from the Northwest over the middle and south Atlantic states. On the morning of the 25th killing frosts were reported in Minnesota and Dakota, and on the morning of the 24th further north. On the 26th snow fell at Haney's Lake and Houtzdale, Pennsylvania. The winds attending the cyclone on the south Atlantic coast were terrible in their force. The Signal Service observers in their journals, and the public press, have fully described them, and also the destruction occasioned by this storm, the influence of which was great even upon the New England and middle Atlantic coasts. The winds over fifty miles per hour are mentioned elsewhere under the heading "High winds;" and winds of over twenty-five miles per hour prevailed at all stations on the coast from Boston, Massachusetts, to the Florida coast.

In closing the description of this cyclone the following extracts are made from the journals of the observers at the following stations:

Jacksonville, Florida, 24th.—"Light rain this a. m. The 7 a. m. reading of the barometer showed that a rapid fall had occurred during the night. * * * The wind increased gradually to a gale at 1 p. m. * * * At 2.25 p. m. up signals received. * * * The wind blew a gale from the west of from 28 to 40 miles from 1 to 6 p. m., after which it gradually moderated."

Savannah, Georgia, 24th.—"Up signals received at 1.30; wind increased in force to 30 miles at midnight; rain fell from 3.20 p. m. to 6.25 p. m.; temperature high and barometer falling slowly. 25th, at 4.30 a. m. wind from nw., 56 miles per hour. The storm was the severest felt here since August 27th, 1881. At Tybee the wind was estimated at 75 miles. There was considerable damage to shipping, and one life was lost, the second officer of the s. s. 'Wm. Lawrence' was drowned."

Charleston, South Carolina, 25th.—"The damage by the storm is estimated at $1,690,000. Twenty-one lives were lost."

Smithville, North Carolina, 25th.—"At 5.15 p. m. the wind had reached the terrific velocity of 98 miles per hour, when the anemometer was blown away; between 5.15 and 5.45 p. m. it is estimated the wind was blowing 125 miles per hour. The cautionary signal raised yesterday undoubtedly saved much property. It is estimated that $100,000 will not cover the entire damage done in the town and county."

Wilmington, North Carolina, 25th.—"Gale from the south in the p. m., accompanied by heavy rain, falling barometer and temperature; maximum velocity of wind, 52 miles."

Hatteras, North Carolina, 24th to 26th.—"Thunder-storm; heavy rain; maximum velocity of wind, 52 miles; up signals received at 7.15 p. m., 24th."

Kitty Hawk, North Carolina, 26th.—"A northerly gale prevailed from 2.30 a. m. until 9.45 a. m.; at 4.10 a. m. a velocity of 50 miles per hour was recorded."

It must be recorded here that the reports and information given by the observers at all the stations on the south Atlantic coast to this office and to the general public were of the most valuable character and of the minutest detail.

On the morning of the 26th the centre was about longitude 70° W. and latitude 35° N., and high winds were reported on the coast of the middle Atlantic states.

In connection with this cyclone, it must be remarked that immense benefit would accrue to the Atlantic and Gulf coast shipping interests, and to the cities upon the coast, if the United States should have four stations in the West Indies and four in Mexico operated and reporting in the same way as those very essential and most valuable stations in the Dominion of Canada. The cost of maintaining or assisting such stations would be slight, indeed, compared to the great loss of property at Charleston, South Carolina, and the value would be shown in one season.

VII.—The approach of this storm was indicated on the morning of the 29th, but the centre could not be definitely placed until the morning of the 30th, when it was a little southeast of New Orleans. By the morning of the 31st the centre had moved northeasterly and was north-northwest of Jacksonville and southwest of Savannah. By midnight the centre had passed off the South Carolina coast. High winds, with heavy rains, prevailed in the south Atlantic and east Gulf states, and the storm would have been thought quite severe if it had not been brought into such close contrast with its predecessor.

NORTH ATLANTIC STORMS DURING AUGUST, 1885.

[*Pressure expressed in inches and in millimetres; wind-force by scale of* 0-10.]

The paths of the atmospheric depressions that have appeared over the north Atlantic have been determined, approximately, from international simultaneous observations furnished by captains of ocean steamships and sailing vessels; abstracts of ships' logs collected by the Signal Service agencies at the ports of New York, Boston, and Philadelphia; reports received through the co-operation of the "New York Herald Weather Service," abstracts of ships' logs furnished by the proprietors of the "New York Maritime Register," and from other miscellaneous data received at this office up to September 22, 1885. The Chief Signal Officer is also indebted to Commander J. R. Bartlett, U. S. N., of the Hydrographic Office, for data used in the preparation of this chart.

The paths of seven atmospheric disturbances are shown on the chart for August, 1885; the more important of these were numbers 3 and 7; the first mentioned being a storm of much energy, which apparently originated within the sub-tropical regions between latitude 25° and 30° N. Number 7 is a continuation of the West Indian hurricane which moved with such disastrous results along the coast of the Carolinas during the last decade of the month. Of the remaining depressions, numbers 2 and 4 displayed considerable storm-energy during their passage; the others, however, were generally of slight intensity.

The following are descriptions of the storms charted:

1.—This was probably a continuation of the depression traced on the chart for the preceding month (July) as number 6. At the close of that month the depression occupied the region near N. 47°, W. 42°, and on August 1st it was shown near N. 52°, W. 38°, the lowest reported barometer being 29.51 (749.5), with moderate s. to sw. gales occurring between W. 30° and 40°. On the 2d the storm-centre was near N. 55° and to the westward of the thirtieth meridian, the pressure remaining unchanged, and by the following day it had passed beyond the field of observation.

2.—This depression appeared between W. 20° and the British coasts on the 8th; the reports indicated the presence of a large, elongated area of low pressure extending from about W. 15° southwestward to the vicinity of the Azores, the barometer within this area ranging from 29.5 (749.3) to 29.75 (755.6), with variable winds, of force 5 to 7. On the 9th the storm-centre became clearly defined in about N. 55°, W. 15°, where the pressure was 29.08 (738.6); during this date moderate to strong southerly gales occurred on the Irish coast and in the Channel, with strong sw. and w. breezes to gales over the northern part of the Bay of Biscay. On the 10th the depression was in the vicinity of the Hebrides, with pressure at the centre less than 29.0 (736.6), and causing moderate to strong ssw. and sw. gales in Ireland, and moderate w. and nw. gales over the ocean between W. 10° and 20°

3.—This disturbance developed, prior to the 8th, over the ocean between N. 30° and 25°, and W. 60° and 65°. At the present writing the earliest report relative thereto is that of the brig "Lilian," H. F. Schive, commanding, as follows: "on the evening of the 7th (in about N. 30°, W. 60°), wind blowing from ene., having shifted from se., with heavy se. and sse. sea, barometer 29.7 (754.4). The wind continued to increase, accompanied by heavy rain, and, at 4 a. m. of the 8th, ship's time, after blowing away the reefed main-staysail, the vessel was run under bare poles, wind hauling gradually to the northward; at

about 8 a. m., ship's time, in about N. 28° 58′, W. 60° 44′, the barometer read 29.2 (741.7), wind blowing a hurricane from n., accompanied by heavy rain; at noon the wind was wnw., and had moderated slightly." The s. s. "Picqua," in N. 28° 19′, W. 54° 25′, on the 7th, had barometer 30.22 (761.1), wind se., force 4, and on the 8th, in N. 28° 0′, W. 58° 4′, barometer 30.14 (765.5), wind s., force 6. Captain Evans, commanding the above-mentioned steamer, remarks, under date of the 7th: "There appears to have been a revolving storm passing to the northward, south of us."

Captain James F. Avery, commanding the bark "Tropic Bird," in about N. 31°, W. 60°, reported, as follows: "The ship had been running west until 8 a. m. of the 8th, with moderate se. wind, gradually increasing to a gale and veering from ese. to e. and back; then hove-to on the port tack under main spencer; wind blowing a heavy gale from ese., and working into ne.; at 12.30 p. m. it was blowing a hurricane, which continued until 3.30 p. m., when it died out to a calm, leaving a heavy swell running. At 4.30 p. m. it began again with wind from wsw., and blowing at a furious rate, until 8 p. m., when it moderated, but the heavy swell continued to run. The hurricane came on without any warning, and was the heaviest that I ever experienced; the barometer did not begin to fall until 8 a. m., and, in four hours, it fell .8 inch, from 30.0 (762.0) to 29.2 (741.7). The vessel lay with her yards in the water, and the topmasts were cut away to right her. After the hurricane passed the barometer rose to 30.0 (762.0) on the morning of the 9th."

Beyond the heavy swell which was observed during the 8th and 9th the passage of this hurricane does not appear to have affected the Bermudas. In this connection, Captain Garvin, commanding the s. s. "Orinoco," reports: "In making Bermuda on the morning of the 9th, we experienced a very heavy swell from se., with stormy appearance in the se.; barometer, 29.97 (761.2). The natives say that the surf on the shores of the island was the heaviest for several years; we had no wind."

The log of the s. s. "Hexham," T. D. Adams, commanding, shows evidence of the existence of the disturbance on the 7th; on the 7th, in N. 34° 47′, W. 54° 45′, that vessel had light winds and fine weather throughout the day, although the sky looked threatening to the southward; a very heavy swell from the southward was also experienced, causing the ship to roll heavily at times; barometer, 29.97 (761.2). The 8th began with fine weather and stationary barometer, but as the day advanced it began to look more threatening in the south, with sea-swell becoming higher; after 8 p. m. the wind freshened from the eastward, with rain, and continued until midnight; barometer, 29.95 (760.7); ship's position at noon, N. 34° 43′, W. 58° 43′.

The bark "Ludwig Heyne" was towed into Bermuda, disabled, on the 15th, having encountered a hurricane in N. 31° 0′, W. 64° 39′, on the 8th.

During the 8th the storm-centre appears to have moved northward, and by the 9th its position may be closely approximated from the reports of the steamers "Hexham" and "Wellfield." Captain Adams, of the "Hexham," reported that after midnight of the 8th the wind suddenly increased in force, veering to the left a little, and continued with increasing force and heavy rain until 4 a. m. of the 9th, when it was about ene., barometer falling rapidly; the ship was then hove-to, the rain and spray making it impossible to see two ship's lengths in any direction, and the mastheads were tipped with the usual "St. Elmo's fires"; frequent and vivid lightning was observed until the wind reached its maximum force, when the lightning ceased. At 6 a. m. the wind was ne., blowing a furious gale. At 8 a. m. it was n., when it lulled considerably for about an hour, the barometer being then at its lowest point, 29.22 (742.2); afterwards the wind gradually hauled to the left and suddenly freshened up from wnw., increasing to a furious gale, which lasted until the afternoon, when it gradually lulled, and at midnight it was almost calm; the barometer rose steadily after 8 a. m. The ship's position at noon of the 9th, by account, was N. 35° 10′, W. 61° 43′.

Captain J. Balley, commanding the s. s. "Wellfield," encountered a hurricane on the 9th; the lowest barometer (corrected), 28.97 (735.8), was observed at noon, in N. 35° 0′, W. 61° 19′; the wind set in from ene., and shifted to ne., n., and nw.

According to newspaper reports the following vessels, viz., barks "Geo. Davis," and "Slieve Bloom," ship "Forest King," and the schooner "Mattie W. Attwood," all between N. 40° and 44°, and W. 53° and 55°, experienced winds of hurricane force in which they sustained damage; in these reports, however, the wind-directions and barometric pressure are not stated.

The storm-centre moved slowly northeastward without any decrease in the force of the gales which accompanied it, and, on the 10th it was near N. 40°, W. 57°. The report of Captain Foote, commanding the s. s. "Greece," is interesting. He states that at the noon observation of the 9th, the weather appeared threatening, the cirro-stratus clouds being particularly noticeable and forming a "mackerel" sky; the wind was then ssw., shifting to sse., with heavy sea-swell from s.; at night a large number of corposants were observed on all the yards. The barometer began to be strongly agitated, rising and falling rapidly, and indicating a decrease of pressure amounting to 1.10 inches (28 m.m.) during the storm that followed. The indexes of the four aneroid barometers moved back and forth like balances, while all the spirit in the sympiesometer was pumped into the larger bulb. The wind gradually increased from midnight of the 9th, and at 6 a. m of the 10th it was blowing a hurricane; soon after 6 a. m. the wind suddenly lulled for ten minutes and then, backing from se. to nw., it blew from that quarter with increased violence. The barometer reached its minimum, 29.11 (739.4) (not reduced to freezing), at 6 a. m. on the 10th, in N 40° 53′, W. 56° 29′. The gale was of six hours duration.

The bark "Kings County," James Saunders, commanding, at 4 a. m. of the 10th had a fresh s. breeze and overcast sky; at 8 a. m., strong gale with heavy swell from sw.; at noon, terrific squalls of hurricane force, continuing until 8 p. m., when it decreased to a strong breeze. The barometer (corrected) fell from 29.8 (756.9), at 4 a. m., to 28.80 (731.5), at 8 a. m., in N. 42° 09′, W. 56° 00′. At noon the barometer had risen again to 29.8 (756.9), the gale increasing as the barometer rose; at 11 a. m. the wind was nw., and at 1 p. m. it was n., where it remained during the day. The s. s. "Polynesia," A. Kuhn, commanding, encountered a hurricane at 7 a. m. of the 10th, and ending at 8 p. m., the lowest barometer, 29.18 (741.2), was observed at 12.30 p. m., in N. 42° 14′, W. 53° 35′; the wind set in from sse., veering to s. sw., w. and wnw.; severe thunder and lightning, with heavy rain, continued during the disturbance. The s. s. "Elysia," James Brown, commanding, in N. 44° 7′, W. 53° 45′, had a fresh to strong gale, with lowest barometer, 29.02 (737.1), at 2 p. m. of the 10th; the gale set in from e. at 6 a. m., and continued from that point, with heavy rain, until 2 p. m., when it fell light, and suddenly shifted to nnw., through ne.; at 4 p. m. the barometer began to rise and the weather moderated. The s. s. "City of Chester," Henry Condron, commanding, in N. 45° 35′, W. 51° 0′, had barometer 29.3 (744.2), at 5 p. m. on the 10th, the wind shifting from se. to ne., and blowing with the force of a whole gale. The bark "Exile," George J. Pearce, commanding, also encountered this storm in N. 44° 05′, W. 49° 40′; at 3 p. m. the gale commenced from ssw., barometer 29.62 (752.3), and at 6 p. m. it was blowing in terrific gusts, barometer 29.42 (747.3); at 8 p. m. it moderated to a steady gale, wind veering to w. and wnw.

On the 11th the storm-centre was near N. 47°, W. 44°, the barometer having risen to 29.4 (746.7), although there was no abatement in the force of the winds. The s. s. "Celtic," B. Gleadell, commanding, reported: "At noon of the 10th barometer read 30.0 (762.0); it fell steadily until 2 p. m. of the 11th, and the wind backed from n. to sw. The storm began at se. on the morning of the 11th, increasing to force 7 (Beaufort scale) at 12 m., and suddenly decreasing to force 1 at 1 p. m. and increasing to 7 again at 2 p. m. During the lull confused,

cross-seas were encountered, and the wind suddenly backed to n., blowing with greater fury than before; from 12 m. till 2 p. m. the barometer reached its lowest point, 29.47 (748.5), in N. 48° 15′, W. 43° 10′; from this time the barometer rose and the wind gradually moderated, the storm having continued twenty-four hours."

During the 12th, 13th, and 14th the storm-centre continued to move slowly northeastward, with pressure varying from 29.3 (744.2) to 29.4 (746.7), and causing moderate to strong gales from sw. to w. over the ocean between N. 45° and 50°, and W. 30° and 40°, while moderate to strong breezes from e. and ne. prevailed to the northward of the fiftieth parallel. On the 15th the disturbance appeared to be losing energy; the barometer had risen to 29.65 (753.1), and the winds had decreased in force; by the 16th the disturbance had disappeared from the chart.

4.—This depression apparently formed near the southeastern edge of the Banks on the 17th, the barometer falling to 29.2 (741.7) over the region between N. 40° and 45° and W. 45° and 55°. On the 17th the s. s. "Brooklyn City," W. Fitt, commanding, in N. 45° 28′, W. 48° 22′, at noon, had barometer 29.49 (749.0), wind s. by e., force 6, threatening weather; 3 p. m., barometer 29.44 (747.8), wind ssw., force 5; 8 p. m., barometer 29.34 (745.2); 11 p. m., barometer 29.24 (742.7), wind nw., force 6, increasing to force 9. The s. s. "City of Chicago," F. Watkins, commanding, reported, at 10 a. m. of the 17th, variable winds, hauling to n. at noon, and increasing to fresh gale at 2 p. m.; at 3 p. m. the wind was ne., moderating to fresh breeze at 8 p. m., and then shifting to nw. The lowest barometer was 29.53 (750.0), at noon, in N. 46° 41′, W. 49° 27′. The s. s. "Saint Bernard," G. Davey, commanding, took the gale at noon of the 17th, with winds from wsw., veering to s. at 1 p. m.; sw. at 4 p. m.; and variable between 5 and 7 p. m.; at 7 p. m. the wind was nw., shifting to n. during the night and blowing with almost hurricane force, accompanied by heavy rain and vivid lightning. The vessel sustained some damage by the heavy seas; the barometric minimum occurred at 6 p. m. on the 17th, while the wind was variable, the lowest reading being 29.26 (743.2), in N. 47° 13′, W. 47° 10′. The s. s. "Zaandam," A. Potjer, commanding, also encountered this storm in N. 45° 32′, W. 46° 20′, the lowest barometer, 29.36 (745.7), being observed at 2 p. m. on the 17th, with wind shifting from s. through w. to nnw. On the 18th the centre of disturbance was near N. 47°, W. 40°, the barometer having fallen to 29.1 (739.1); during this date strong gales occurred in all quadrants of the depression, but were most violent in the western quadrants. During the 19th and 20th the depression moved slowly northeastward, with but slight decrease in energy, the pressure ranging from 29.2 (741.7), to 29.5 (749.3). On the 21st the disturbance appears to have moved to the southeastward, with increasing pressure, and by the following day it had disappeared from the chart.

5.—This was probably a continuation of the depression traced over the North American continent as number v. On the 23d it occupied Newfoundland and the Gulf of Saint Lawrence, and by the following day it was shown near N. 48°, W. 45°, the lowest barometer reported being 29.6 (751.8). By the 25th it had passed eastward to about N. 48°, W. 32°, where the pressure ranged from 29.45 (748.0) to 29.5 (749.3). During the day this disturbance probably merged in an extensive depression which occupied the ocean between N. 40° and 50°, and W. 20° and 35°. Strong winds to moderate gales accompanied the passage of this depression.

6.—This disturbance moved from the northern part of the Gulf of Saint Lawrence during the 25th. On the 26th the region of least pressure was to the northward of the fiftieth parallel and west of the fortieth meridian; on the following day the lowest barometric readings were shown near W. 30°, where this depression apparently filled in. During the passage of the disturbance the barometer ranged from 29.4 (746.7) to 29.7 (754.4), and strong sw. and w. breezes were experienced by vessels near the fiftieth parallel.

7.—This was a continuation of the tropical hurricane which moved over the Carolinas on the 24th and 25th. It appears to have originated between the Bahamas and the southern coast of Florida on the 23d, but owing to the absence of reports from the above region the exact date of its formation and the location of the centre cannot at present be determined. The following data, however, clearly indicate its presence on the 23d:

The Rev. Benito Viñes, S. J., director of the Belen College Observatory, at Havana, writing to the "Maritime Journal" of Havana, on the 24th, states: "* * * During the 21st and 22d and on the morning of the 23d we were under the influence of a strong anti-cyclone, which apparently passed rapidly to the northwest. Since yesterday afternoon (23d) occasional indications of a cyclone, at a considerable distance to the eastward, have been observed. * * *"

On the 23d the schooner "E. B. Conwell" encountered a hurricane off the Florida Reefs. Captain Foster reported that the hurricane began from ne. on the 23d, the wind going around the compass and ending in a southwest gale, which lasted five hours. During this time the vessel lay on her side, and the masts were cut away to right her.

The s. s. "City of Pueblo," J. Deaken, commanding, left Havana on the 22d and encountered the hurricane on the night of the 23d, in about N. 25°, W. 80°. The gale began at nnw. and nw. at about 8 p. m., increasing in force until, at midnight, it was blowing with hurricane force and the barometer had fallen to 29.6 (751.8); at 2 a. m. of the 24th it had fallen to 29.28 (743.7) and the wind had shifted through west to southwest, continuing to blow with hurricane force, and accompanied by violent rain squalls; at 2 a. m. the ship was hove-to, and at 4 p. m on the 24th, the barometer having risen to 29.8 (756.9), she was put on her course, the wind being then s. and blowing a fresh gale. Captain Risk, commanding the s. s. "Alamo," reported as follows: "I passed Cape Hatteras Sunday, August 23, at 9.30 p. m., standard time, the weather looking bad, "sun-dogs" all day, sky gray and very heavy. We commenced to meet a heavy sw. swell which, towards morning, grew worse; wind south. On Monday morning wind and sea hauling southwesterly, at times sea-swell at wsw., and wind sw., blowing a good gale; during Monday night, same weather; Tuesday, no change until the evening, when the wind hauled to se. by s., blowing hard and puffy, which lasted until midnight, when the gale broke and the wind hauled back to sw. by s. The barometer fell to 29.83 (757.7) on the 24th." The s. s. "Alamo" was bound from New York to Galveston. Vessels to the eastward of the Bahamas do not appear to have noted any indications of a hurricane on the 22d and 23d.

On the 24th the hurricane entered Florida, whence it moved northward and northeastward over the South Atlantic seaboard states. A description of this hurricane, and the disastrous results of the same during its passage over the above states, will be found under "Cyclonic areas," number vi, in this REVIEW.

The following reports show the violence of the hurricane at sea:

On the 24th the schooner "Florence and Lilian" encountered the hurricane in N. 29° 52′, W. 80° 25′, and lost sails, deck-load, and sustained damage to deck.

The s. s. "Louisiana," E. V. Gager, commanding, reported a hurricane on the 24th, with wind at s., veering to w. about the time of lowest barometer, which was (corrected) 28.83 (732.3), in N. 31° 30′, W. 80° 30′, at 1 a. m. on the 25th.

During the 25th, all vessels between N. 30° and 37° and between the United States coast and the seventieth meridian experienced furious gales, reaching at times hurricane force, from ssw., sw., and se., with pressure ranging from 29.03 (737.3) to 29.5 (749.3).

In the early morning of the 26th the winds south of 35° N. shifted to n. and nw., indicating that the storm-centre had passed northeastward off the coast line. At 1 a. m. on the 26th, the s. s. "Haytien Republic," D. T. Compton, commanding, reported that the wind, which at midnight of the 25th was

blowing a heavy gale from sw., struck the ship in a heavy squall from ssw. to nnw., lasting only a few minutes from any one direction; from 2 a. m. to 4 a. m. had very heavy squalls from w. with heavy rain, wind backing to sw. after each squall; from 8 to 10 a. m. heavy squalls from nw., ship's position at noon, N. 34° 42′, W. 74° 05′. The s. s. "Fortunatus," G. R. Mawer, commanding, reported that at 2 a. m. the wind moderated, and at 7 a. m. it came out from ne. and increased to a heavy gale with very heavy sea from ene., barometer at 8 a. m., 29.01 (736.8); latitude at noon, 38° 31′ N., longitude, 73° 20′ W. At 4 a. m. the s. s. "Louis Bucki," R. Mount, commanding, in N. 36° 44′, W. 74° 50′ had wind from n., remaining steady and blowing with hurricane force. Captain Mount reports "from midnight of 25th to 4 a. m. the wind hauled twice around the compass from sw. by the w. to n., and to s. by e."

The s. s. "City of Puebla" appears to have again entered the southwest quadrant of the disturbance after it had recurved and passed northeastward; that vessel, in about N. 35°, W. 75°, on the 26th, had barometer falling from 29.8 (756.9) to29.6 (751.8), with wind hauling to nnw. and blowing a gale, with heavy rain; at 10 a. m. the weather began to moderate and the barometer rose.

After reaching the ocean the rate of movement of the storm-centre appears to have increased greatly, and by midnight of the 26th the centre was between W. 60° and 65°, the barometer remaining about 29.1 (739.1), and strong gales were reported in all quadrants of the disturbance.

During the 27th the storm-centre moved rapidly northeastward, the barometer falling as low as 28.8 (731.5) during the passage of the storm-centre, while strong gales were experienced by all vessels between the meridians of 40° and 60° W., and from N. 40° to N. 50°.

On the 28th, the region of least pressure, where the barometer read 29.0 (736.6), was near N. 50°, W. 40°, and moderate to strong w. and sw. gales were now reported on the fiftieth parallel and between W. 30° and 40°.

On the 29th, the pressure had increased to 29.9 (759.4), and the disturbance had disappeared beyond the region covered by the reports.

OCEAN ICE.

On chart i are also shown the eastern and southern limits of the north Atlantic ice-region for August, 1885. These limits are determined from reports furnished by shipmasters, and from trustworthy data published in the "New York Maritime Register" and other newspapers.

During the month the easternmost icebergs were observed between the meridians of 42° and 43° W., and the parallels of 45° and 50° N., and the extreme southern limit of the ice-region was near 43° 50′ N., 52° 0′ W. The small number of icebergs observed during August, 1885, would seem to indicate that the Atlantic is now comparatively clear of ice.

A comparison with the chart for the preceding month (July, 1885,) shows that, while the icebergs are considerably diminished in number, they are, however, somewhat farther eastward than those of July; the southern limit is about one degree north of that for last month.

The following table shows the comparison between August, 1885, and the same month of the three preceding years:

Southern limit.			Eastern limit.		
Date.	Lat. N.	Lon. W.	Date.	Lat. N.	Lon. W.
	° ′	° ′		° ′	° ′
August, 1882	46 50	46 00	August, 1882	46 50	46 00
August, 1883	43 26	51 41	August, 1883	48 00	44 00
August, 1884	43 24	48 44	August, 1884	47 50	43 50
August, 1885	43 48	52 04	August, 1885	48 03	42 45

Icebergs were reported during the month as follows:

1st.—S. S. "Ontario," in N. 52° 8′, W. 50° 47′, passed four large icebergs.

2d.—S. S. "Ontario" passed several large icebergs to the westward of Belle Isle; s. s. "Schiedam," in N. 48° 12′, W. 44° 35′, passed a large iceberg.

3d.—S. S. "Australia," in N. 48° 00′, W. 46° 47′, passed an iceberg about one hundred and fifty feet high, with several small pieces near it; also passed another berg about fifteen miles to the southward.

4th.—S. S. "Norseman," in N. 48° 10′, W. 48° 20′, passed a very large iceberg; temperature of the air, 49°; water, 48°.

5th.—S. S. "Austrian," in N. 47° 23′, W. 43° 14′, passed a large iceberg; s. s. "Pavonia," in N. 43° 49′, W. 51° 37′, passed a large iceberg; in N. 43° 48′, W. 52° 04′, passed a medium-sized iceberg; also, in N. 43° 57′, W. 52° 12′, passed another.

6th.—S. S. "Wyoming," at 3.30 p. m., in N. 48° 3′, W. 42° 45′, passed a large iceberg; s. s. "St. Stephen," in N. 47° 54′, W. 42° 45′, passed an iceberg about two hundred and fifty feet high; temperature of water, 48°; bark "Natant," in N. 44° 55′, W. 43° 10′, passed a large iceberg.

9th.—S. S. "Neckar," in N. 48° 48′, W. 43° 30′, passed a medium-sized iceberg; temperature, 57°.

10th.—S. S. "Elysia," in N. 44° 08′, W. 52° 30′, passed an iceberg.

23d.—S. S. "St. Laurent," in N. 48° 06′, W. 47° 40′, passed an iceberg; temperature of air, 57°.2; water, 50°.0.

24th.—S. S. "Lydian Monarch," in N. 48° 55′, W. 47° 18′, passed a large iceberg.

29th.—Brig "Bessie May," in N. 47° 10′, W. 47° 20′, passed six icebergs, the largest being about one-quarter of a mile long and about one hundred feet high.

31st.—S. S. "Edam," in N. 46° 50′, W. 47° 40′, passed three large icebergs and several pieces; s. s. "City of Berlin," in N. 46° 55′, W. 47° 04′, passed three icebergs and several small pieces.

The following are taken from the daily ice reports of the "International Nautical Magazine."

August 2d.—Ship "W. H. Smith," in N. 48° 17′, W. 49° 09′, passed five large icebergs; water, 48°; air, 52°

3d.—Ship "W. H. Smith," in N. 47° 50′, W. 50° 00′, passed a large iceberg.

8th.—Brig "Aquatic," in N. 48° 40′, W. 43° 25′, passed a large iceberg.

SIGNAL SERVICE AGENCIES.

Signal Service agencies have been established in the Maritime Exchange buildings at New York and Philadelphia, and in the Custom-House, Boston, where the necessary blanks and other information will be furnished to ship-masters.

In pursuance of the arrangements made with the Meteorological Office of London, England, there were cabled to that office from New York during August, 1885, six reports concerning storms and icebergs encountered by vessels in the Atlantic west of the forty-fifth meridian; one message was sent from Boston.

TEMPERATURE OF THE AIR.

[*Expressed in degrees, Fahrenheit.*]

The distribution of mean temperature over the United States and Canada for August, 1885, is exhibited on chart ii by the dotted isothermal lines; and in the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service.

On chart iv the departures from the normal temperature are exhibited by lines connecting stations of equal departure. It will be seen from this chart that over the greater part of the country the month was colder than the average August. The departures below the normal temperature were most marked over the northern districts from Montana and Wyoming eastward to New England, where they varied from 4° to 7°. Along the middle and south Atlantic coasts, in the Gulf States, Rio Grande Valley, southern slope, middle plateau, north and middle Pacific coast regions the mean temperatures correspond very nearly with the normal, there being slight departures both above and below in these districts. In the southern plateau and south Pacific coast region, the mean temperatures are from 1° to 3° above the normal.

In the following table are given the mean temperatures for the several geographical districts, with the normal and departures, as deduced from Signal Service observations:

Average temperatures for August, 1885.

Districts.	Average for August. Signal-Service observations.		Comparison of August, 1885, with the average for several years.
	For several years.	For 1885.	
	°	°	°
New England	68.3	66.2	— 2.1
Middle Atlantic States	73.7	73.4	— 0.3
South Atlantic States	78.4	79.0	+ 0.6
Florida Peninsula	81.8	81.9	+ 0.1
Eastern Gulf States	79.2	78.9	— 0.3
Western Gulf States	81.0	80.9	— 0.1
Rio Grande Valley	83.1	83.1	0.0
Tennessee	76.8	76.9	+ 0.1
Ohio Valley	74.8	72.6	— 2.2
Lower Lake region	70.4	65.5	— 4.9
Upper Lake region	66.4	61.3	— 5.1
Extreme Northwest	66.0	60.7	— 5.3
Upper Mississippi Valley	73.6	69.6	— 4.0
Missouri Valley	72.6	67.8	— 4.8
Northern slope	67.2	63.7	— 3.5
Middle slope	72.7	71.2	— 1.5
Southern slope	76.9	77.7	+ 0.8
Southern plateau	75.4	76.6	+ 1.2
Middle plateau	72.6	72.2	— 0.4
Northern plateau	70.3	71.3	+ 1.0
North Pacific coast region	64.1	64.3	+ 0.2
Middle Pacific coast region	66.4	67.2	+ 0.8
South Pacific coast region	69.1	72.2	+ 3.1

DEVIATIONS FROM NORMAL TEMPERATURES.

In the table below are given, for certain stations, as reported by voluntary observers, the normal temperatures for August for a series of years; the mean temperature for August, 1885, and the departures from the normal:

Stations.	County.	Normal temperature for August.	Number of years.	Mean temperature for Aug., 1885.	Departure.
		°		°	°
Arkansas.					
Lead Hill	Boone	72.5	3	78.4	+2.3
Dakota.					
Webster	Day	74.1	3	67.1	−7.0
Illinois.					
Collinsville	Madison	76.7	.....	70.4	−6.3
Anna	Union	77.9	10	75.8	−2.1
Mattoon	Coles	75.9	5	75.2	−0.7
Riley	McHenry	68.2	24	66.9	−1.3
Swanwick	Perry	74.8	4	74.3	−0.5
Sycamore	DeKalb	69.9	4	64.4	−5.5
Peoria	Peoria	75.2	30	73.2	−2.0
Indiana.					
Lafayette	Tippecanoe	72.3	6	68.3	−4.0
Logansport	Cass	72.8	20	70.4	−2.4
Vevay	Switzerland	75.9	21	74.3	−1.6
Kansas.					
Independence	Montgomery	78.4	14	74.8	−3.6
Manhattan	Riley	77.1	25	74.1	−3.0
Wellington	Sumner	75.6	7	74.4	−1.2
Yates Centre	Woodson	75.8	5	74.1	−1.7
Maine.					
Gardiner	Kennebec	66.7	49	63.5	−3.2
Maryland.					
Fallston	Harford	71.7	13	70.4	−1.3
Massachusetts.					
Somerset	Bristol	72.2	.....	71.2	−1.0
Worcester	Worcester	68.2	47	64.5	−3.7
Nevada.					
Carson City	Ormsby	73.2	.....	70.9	+2.3
New Jersey.					
South Orange	Essex	71.1	15	66.8	−4.3
New York.					
North Volney	Oswego	68.0	18	63.2	−4.8
Palermo	Oswego	67.3	32	61.6	−5.7
Menand Station	Albany	70.1	3	66.5	−3.6
Ohio.					
Wauseon	Fulton	69.8	15	65.8	−4.0
Pennsylvania.					
Dyberry	Wayne	65.2	18	63.7	−1.5
Texas.					
New Ulm	Austin	82.4	14	83.7	+1.2
Vermont.					
Woodstock	Windsor	65.0	18	63.0	−2.0
Virginia.					
Bird's Nest	Northampton	77.0	.....	79.9	+2.9
Wytheville	Wythe	71.0	21	70.0	−1.0
West Virginia.					
Helvetia	Randolph	67.7	9	67.2	−0.5
Wisconsin.					
Beloit	Rock	69.6	36	65.1	−4.5

The following notes on the temperature for the summer months of 1885, are also reported by voluntary observers:

Riley, McHenry county, Illinois: the mean temperature for the summer of 1885 is 66°.9, or 1°.3 below the summer normal for the last twenty-four years. During that period the mean temperature for summer has been lower than that for 1885, in but four years, viz., 1865, '66, '76, and '82.

Logansport, Cass county, Indiana: in but five years, viz., 1856, '66, '75 and '83, since 1855, has the mean temperature for August been lower than that for August, 1885.

Yates Centre, Woodson county, Kansas: the mean temperature for the summer of 1885 is 75°.1, or 0°.7 below the summer average for the last five years.

South Orange, Essex county, New Jersey: the mean temperature for the summer of 1885 is 70°.5, or 1° below the summer normal for fifteen years.

Palermo, Oswego county, New York: the mean temperature for the summer of 1885 is 63°.0, or the lowest summer temperature recorded in the last thirty-two years.

North Volney, Oswego county, New York: mean temperature for the summer of 1885, 65°.1, is the lowest summer mean recorded in the last seventeen years. The warmest summer of that period occurred in 1870, the mean being 71°.6. The mean temperature for August, 1885, 63°.2, is the lowest recorded for that month during the last eighteen years.

Strafford, Orange county, Vermont: August, 1885, was colder than any corresponding month in the eleven preceding years.

Woodstock, Windsor county, Vermont: mean temperature for August, 1885 is 63°.0; the highest August mean for the last eighteen years, 68°.4, occurred in 1877; the lowest, 60°.7, occurred in 1869.

Beloit, Rock county, Wisconsin: the mean temperature (65°.1) for August, 1885, is the lowest recorded for that month during the last thirty-six years.

Wauseon, Fulton county, Ohio: during the last fourteen years the month of August has in but two instances been colder than August of the current year. The mean temperature for the summer season, June, July and August, of 1885, is 68°.9, or 1°.3 below the normal for the period above named.

HIGH TEMPERATURES.

Cedar Keys, Florida: the heat on the 5th was very oppressive. The first case of sunstroke ever known at this place occurred on that date.

Merced, California: very hot weather prevailed in this vicinity about the 18th; on that date the temperature remained at 120° in the shade for several hours during the day, and was but slightly below 100° at night.

Walla Walla, Washington Territory: the 18th was the hottest day experienced in this locality for several years; the thermometer in the shade indicated 108°; business was almost entirely suspended on account of the intense heat.

Dayton, Washington Territory: the maximum temperature on the 18th, 108°.7, is the highest recorded at this station since its establishment. Very warm weather also prevailed on the 15th, 16th, and 17th, the temperature reaching 102°. On the 18th a thermometer placed against a window casement, in the sunshine, rose to 140° at 2 p. m., local time.

RANGES OF TEMPERATURE.

The monthly, and the greatest and least daily ranges of temperature are given in the table of miscellaneous meteorological data. The monthly ranges were greatest at certain stations in Idaho, Montana, and Washington Territories, 64°, at Fort Benton, Montana, being the largest reported; they were least along the Gulf and Pacific coasts, the least, 18°.9, occurring at Key West, Florida.

FROSTS.

Frosts occurred in the various states and territories during the month, as follows:

Colorado.—Pike's Peak, 8th, 13th, 24th, 27th; Braddock, 9th, 11th to 22d, 25th to 31st.

Connecticut.—New Haven, Bethel and Hartford, 27th, 28th.

Table of comparative maximum and minimum temperatures for August.

State or Territory.	Station.	For 1885.		Since establishment of station.			
		Max.	Min.	Max.	Year.	Min.	Year.
		°	°	°		°	
Alabama	Mobile	94.2	69.0	100.0	1874	53.0	1884
Do	Montgomery	95.4	64.9	103.0	1874	61.5	1879
Arizona	Prescott	90.7	50.3	99.0	1878	38.0	1876
Do	Yuma	.....	.....	115.0	1879	64.0	1879
Arkansas	Fort Smith	97.5	57.1	103.7	1884	58.4	1884
Do	Little Rock	98.7	64.3	102.0	1881	59.2	1884
California	San Francisco	81.0	52.0	89.0	1879	50.0	'75,'79,'82
Do	Red Bluff	107.5	58.5	110.5	1878	52.0	1881
Colorado	Denver	92.8	46.4	105.0	1878	44.0	1879
Do	Pike's Peak	52.2	26.0	62.0	1878	15.0	1882
Connecticut	New Haven	86.5	45.1	90.0	1873, 1876, 1881, 1884	45.7	1884
Do	New London	85.0	48.8	90.0	1873	47.5	1884
Dakota	Fort Buford	90.5	39.6	107.0	1882	36.0	1883
Do	Yankton	88.6	46.2	103.0	1874	45.0	1875
Delaware	Del. Breakwater	.....	.....	93.0	1881	60.0	1881
Do	Cape Henlopen	98.1	53.5	.....	.....	.....	.....
Dist. of Columbia	Washington City	91.2	50.8	101.0	1881	50.0	1874
Florida	Jacksonville	94.4	70.2	100.0	1874	66.0	1874, 1875
Do	Key West	94.0	75.1	95.4	1881	72.0	1882, 1884
Georgia	Augusta	99.1	63.7	108.0	1878	61.0	1874
Do	Savannah	94.0	69.0	100.0	1878	63.0	1879
Idaho	Boisé City	95.8	49.5	103.0	1879	39.0	1881
Do	Lewiston	105.2	51.5	110.6	1882	45.0	1882
Illinois	Cairo	94.8	54.5	103.0	1881	57.0	1880, 1884
Do	Chicago	.....	.....	98.0	1874	47.0	1872
Indiana	Indianapolis	95.1	47.7	101.0	1881	48.0	1876
Indian Territory	Fort Sill	103.5	56.0	105.0	1881	53.0	1880
Do	Fort Supply	97.5	54.0	.....	.....	.....	.....
Iowa	Dubuque	86.4	46.1	97.3	1881	41.0	1875
Do	Keokuk	97.9	49.1	102.0	1873	47.0	1875
Kansas	Leavenworth	97.5	52.0	107.0	1871	50.0	1884
Do	Dodge City	95.5	52.4	101.6	1881	50.0	1880
Kentucky	Louisville	96.7	52.4	104.6	1881	59.0	1880
Louisiana	New Orleans	93.7	69.6	96.5	1877	63.5	1881
Do	Shreveport	100.7	61.8	105.0	1881	58.0	1880
Maine	Eastport	75.2	45.5	88.0	1880	45.0	1880
Do	Portland	84.6	47.5	95.0	1876	48.0	1874
Maryland	Baltimore	93.5	53.4	98.0	1881	52.0	1875
Massachusetts	Boston	88.8	47.2	96.8	1881	47.0	1880
Do	Springfield	.....	.....	93.0	1879	45.0	1880
Michigan	Marquette	83.1	42.1	96.0	1879	34.7	1883
Do	Detroit	86.0	48.4	98.8	1881	45.0	1875
Minnesota	Duluth	81.3	43.8	93.0	1881	45.0	1876
Do	Saint Paul	84.2	46.1	98.0	1880	43.0	1875
Mississippi	Vicksburg	97.2	61.8	100.0	1878	62.0	1879
Missouri	Saint Louis	95.0	53.5	106.4	1881	54.0	1884
Montana	Fort Benton	104.9	40.9	108.0	1881	34.0	1881
Do	Helena	92.7	38.3	95.0	1880	34.0	1880
Nebraska	North Platte	89.1	51.2	103.0	1878	42.0	1876
Do	Omaha	90.8	50.4	105.0	1874	49.0	1877
Nevada	Winnemucca	94.1	44.3	102.5	1882	32.0	1880
New Hampshire	Mount Washington	61.8	23.4	74.0	1872	20.0	1876
New Jersey	Atlantic City	89.3	48.8	91.8	1881	53.0	1879
Do	Sandy Hook	90.4	54.0	96.2	1881	55.0	1874
New Mexico	Santa Fé	88.0	49.0	97.0	1878	40.0	1882
New York	Buffalo	82.7	49.1	99.8	1881	44.0	1880
Do	New York City	89.0	51.0	96.0	1881	53.0	1874
North Carolina	Charlotte	93.5	55.8	100.5	1881	56.0	1879
Do	Wilmington	93.5	60.0	99.0	1878	56.0	1874
Ohio	Cincinnati	94.0	50.9	101.0	1881	55.0	1872, 1875
Do	Cleveland	86.5	45.6	98.7	1881	45.6	1876
Oregon	Portland	94.5	47.5	94.2	1884	43.0	1876
Do	Roseburg	91.6	40.1	97.2	1884	40.5	1882
Pennsylvania	Philadelphia	90.8	51.1	99.0	1881	53.0	1874
Do	Pittsburg	94.6	47.4	99.8	1881	49.0	1876
Rhode Island	Block Island	81.9	52.9	82.0	1882	54.5	1884
Do	Newport	.....	.....	87.0	1876, 1879	52.0	1880
South Carolina	Charleston	93.2	67.5	97.5	1881	62.0	1879
Tennessee	Knoxville	92.8	56.2	100.0	1881	50.0	1879
Do	Nashville	96.1	56.5	104.0	1874	54.7	1883
Texas	Galveston	95.0	72.5	98.5	1874	70.0	'77,'80,'82
Do	Fort Davis	97.0	55.8	100.0	1884	47.0	1882
Utah	Salt Lake City	100.3	51.0	101.0	1875	44.0	1880
Vermont	Burlington	.....	.....	97.0	1870	40.0	1880
Virginia	Lynchburg	94.3	51.4	100.0	1881	50.0	1874
Do	Norfolk	94.3	60.4	99.0	1881	58.0	1874
Washington Ter.	Dayton	108.7	45.0	101.8	1884	36.0	1883
Do	Olympia	92.2	44.2	92.0	1884	41.0	1880, 1882
West Virginia	Morgantown	.....	.....	92.2	1881	46.0	1874
Wisconsin	La Crosse	83.5	43.8	96.0	1874, 1881	44.0	1875
Do	Milwaukee	85.5	46.3	98.0	1874	42.0	1875
Wyoming	Cheyenne	86.6	40.5	96.1	1882	34.0	1876

Dakota.—Pembina, 24th; Vermillion, 31st.

Illinois.—Windsor, 14th, 26th; Swanwick, 26th; Bloomington, 27th.

Indiana.—Logansport and Spiceland, 15th; Guilford, 27th, 28th.

Iowa.—Dubuque, Cresco, Independence, Manchester and Maynard, 26th.

Maine.—Bangor, light frosts were reported at points along the river north of station on the 26th and 27th; Buckfield, 26th; Gardiner, 26th, 28th; Cornish, 27th, 28th.

Massachusetts.—Worcester, 26th, 27th; Rowe and Amherst, 27th; Heath, 27th, 28th; Taunton, 29th.

Michigan.—Traverse City, 14th; Buchanan, 14th, 26th; Grand Haven, East Tawas and Mottville, 15th; Manistique, 15th, 25th, 26th; Alpena, 24th; Escanaba, 25th; Thornville, 29th.

Minnesota.—Rochester and Northfield, 26th; Moorhead, 25th, 31st. The Signal Service observer at Saint Vincent reports that the first killing frost of the season occurred on the 24th, and that it is estimated that one-half of the wheat crop was ruined; a light frost occurred on the 31st.

New Hampshire.—Mount Washington, 8th, 16th, 20th, 25th to 30th.

New York.—Humphrey, 17th; Le Roy, 25th, 26th; Factoryville and Ithaca, 26th; Cooperstown, 27th, 28th.

Ohio.—Wauseon, 16th, 27th; Yellow Springs, 26th, 27th, 28th; Garrettsville, 28th.

Pennsylvania.—Pittsburg, light frost is reported to have occurred in the suburbs on the 27th, and at various places in the western part of the state on the morning of the 28th; Troy, 16th, 25th; Wellsborough and Grampian Hills, 27th; Chambersburg and South Bethlehem, 27th, 28th; Drifton and Dyberry, 28th.

Rhode Island.—Narragansett Pier, 28th.

Vermont.—Newport and Brattleborough, 8th; Strafford and Woodstock, 26th, 27th, 28th; Charlotte and Post Mills, 27th, 28th.

Virginia.—Snowville, 26th, the first frost known to have occurred in August for the last twelve years.

Wisconsin.—Wausau, 25th, 26th; La Crosse, Embarras and Neillsville, 26th. The cautionary signal displayman at Green Bay, reports that about one-third of the cranberry crop in the vicinity of Peshtigo, Marinette county, was destroyed by frosts on the 25th and 26th.

Wyoming.—Fort Bridger, 29th.

PRECIPITATION.

[*Expressed in inches and hundredths.*]

The distribution of rainfall over the United States and Canada for August, 1885, as determined from reports from more than eight hundred stations, is exhibited on chart iii.

In the following table are shown, for the several geographical districts, the normal August precipitation for a series of years, the average for August, 1885, and the excess or deficiency as compared with the normal:

Average rainfall for August, 1885.

Districts.	Average for August, Signal-Service observations.		Comparison of August, 1885, with the average for several years.
	For several years.	For 1885.	
	Inches.	*Inches*	*Inches.*
New England	3.42	6.41	+2.47
Middle Atlantic States	4.91	4.88	−0.03
South Atlantic States	6.30	7.67	+1.37
Florida Peninsula	7.67	6.74	−0.93
Eastern Gulf States	5.44	5.43	−0.01
Western Gulf States	3.92	1.82	−2.10
Rio Grande Valley	4.66	1.52	−3.14
Tennessee	3.77	2.71	−1.06
Ohio Valley	3.37	4.61	+1.24
Lower lake region	3.06	5.10	+2.04
Upper lake region	3.11	5.22	+2.11
Extreme northwest	3.13	1.61	−1.52
Upper Mississippi Valley	3.21	5.48	+2.27
Missouri Valley	3.02	6.04	+3.02
Northern slope	1.38	1.85	+0.47
Middle slope	2.58	4.17	+1.59
Southern slope	3.87	3.66	−0.21
Southern plateau	2.98	1.69	−1.29
Middle plateau	0.47	0.47	0.00
Northern plateau	0.29	0.19	−0.10
North Pacific coast region	0.69	trace.	−0.69
Middle Pacific coast region	0.04	0.20	+0.16
South Pacific coast region	0.10	0.06	−0.04

With the exception of the extreme northwest, the precipitation for August, 1885, was unusually large over the central and northern portions of the country east of the one hundred and fifth meridian; it was also very heavy along the coasts of South Carolina and Georgia. At Charleston, South Carolina,

the monthly precipitation, 19.18, was nearly three times the average for August at that station, and exceeded by more than four inches the largest monthly precipitation that has occurred since the Signal Office was established in 1871, the following being some of the largest recorded during the fourteen years of observations: August, 1871, 14.97; July, 1874, 13.74; June, 1876, 14.98; October, 1876, 14.32; April, 1877, 15.00. In the upper portions of the Missouri, Mississippi, and Ohio valleys, in the lake region, and New England, a very large excess over the average August precipitation also occurred. At Chicago, Illinois, the precipitation, 11.30, was more than four times as great as the August average for the last fourteen years, and was the largest recorded in any month during the period mentioned, the next largest being 7.36, for October, 1883. At Albany and Buffalo, New York; Erie, Pennsylvania; Baltimore, Maryland; Boston, Massachusetts, and on the summit of Mount Washington, New Hampshire, the precipitation exceeded the average by amounts ranging from three to more than seven inches.

Over an area extending from the Atlantic coast, between Cape May, New Jersey, and Hatteras, North Carolina, westward to the Indian Territory, and also in the southern districts from the lower Mississippi River to the Pacific coast the precipitation was below the average. In the Rio Grande Valley, west Gulf states, southern plateau, and in Tennessee the deficiencies ranged from one to three inches.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows, for certain stations as reported by voluntary observers, the average precipitation for the month of August for a series of years, the precipitation for August, 1885, and the departures from the average:

Station.	County.	Average precipitation for August.	Number of years.	Precipitation for August, 1885.	Departure.
		Inches.		Inches.	Inches.
Arkansas.					
Lead Hill	Boone	5.33	3	4.14	−1.19
Connecticut.					
Hartford	Hartford	4.34	13	8.84	+4.50
Dakota.					
Webster	Day	2.96	3	1.41	−1.55
Illinois.					
Anna	Union	4.61	10	4.13	−0.48
Collinsville	Madison	4.05	.....	2.93	−1.12
Mattoon	Coles	2.83	5	7.80	+4.97
Riley	McHenry	3.38	24	6.80	+3.42
Swanwick	Perry	2.93	5	3.19	+1.26
Sycamore	De Kalb	2.13	4	9.90	+7.77
Indiana.					
Lafayette	Tippecanoe	2.57	6	4.93	+2.36
Logansport	Cass	3.32	20	2.72	−0.60
Vevay	Switzerland	3.14	21	3.82	+0.68
Kansas.					
Independence	Montgomery	2.91	13	7.46	+4.55
Manhattan	Riley	3.24	25	0.89	−2.35
Wellington	Sumner	2.28	7	0.61	−1.67
Yates Centre	Woodson	1.93	5	2.28	+0.35
Maine.					
Gardiner	Kennebec	3.75	47	3.21	−0.54
Maryland.					
Fallston	Harford	4.80	14	10.75	+5.95
Massachusetts.					
Somerset	Bristol	4.34	.....	4.18	−0.16
Worcester	Worcester	5.40	43	6.52	+1.12
Nevada.					
Carson City	Ormsby	0.14	.....	0.10	−0.04
New Hampshire.					
Antrim	Hillsborough	2.49	12	6.00	+3.51
New Jersey.					
South Orange	Essex	5.39	15	7.55	+2.16
New York.					
Ithaca	Tompkins	2.64	.....	8.14	+5.50
North Volney	Oswego	2.40	14	2.20	−0.20
Palermo	Oswego	2.47	32	2.98	+0.51
North Carolina.					
Raleigh	Wake	5.20	15	6.40	+1.20
Ohio.					
Wauseon	Fulton	2.79	13	4.36	+1.57
Pennsylvania.					
Dyberry	Wayne	3.43	14	8.77	+5.34
Texas.					
New Ulm	Austin	3.02	14	0.09	−2.91
Vermont.					
Woodstock	Windsor	2.84	17	8.48	+5.64
Virginia.					
Wytheville	Wythe	3.70	21	3.70	0.00
West Virginia.					
Helvetia	Randolph	4.40	9	3.14	−1.26
Wisconsin.					
Beloit	Rock	3.90	36	9.23	+5.33

The following notes on the precipitation for the summer months of 1885 are also reported by voluntary observers:

Riley, McHenry county, Illinois: the precipitation for the summer of 1885 is 14.67, or 3.14 in excess of the summer average for the last twenty-four years; in but four years of that period has the precipitation been greater, viz., in 1862, 1865, 1866, and 1868.

Yates Centre, Woodson county, Kansas: the precipitation for the summer of 1885 is 17.02, or 7.99 in excess of the summer average for the last five years.

South Orange, Essex county, New Jersey: the precipitation for the three months ending with August is 11.58, or 1.50 below the summer average for the last fifteen years.

North Volney, Oswego county, New York: the rainfall for the summer season of 1885 is 9.60, the average for the last thirteen years being 9.21. During that period the greatest summer precipitation, 14.30, occurred in 1874; the least, 6.10, occurred in 1876.

Cooperstown, Otsego county, New York: the month of August, 1885, was marked by excessive precipitation; more rain fell than in any August during the last thirty years. During that period monthly rainfalls exceeding seven inches occurred as follows: June, 1857, 7.80; July, 1861, 7.36; July, 1863, 7.92; May, 1867, 7.38; June, 1872, 7.31; August, 1885, 9.08.

Ithaca, Tompkins county, New York: the meteorological records of Cornell University show that the rainfall (8.14) for August, 1885, exceeded by 4.20 the largest August precipitation previously recorded there.

Menand Station (near Albany), New York: the rainfall for August was remarkably heavy; it exceeded the aggregate for the three preceding months by 0.88.

Wellsborough, Tioga county, Pennsylvania: the rainfall, 15.23, for August, 1885, is the heaviest recorded here since 1860; the largest amount previously recorded in any month being 12.32 for July, 1883. The aggregate precipitation for the period from January 1 to July 31, 1885, only exceeds that for August by 4.32.

Bainbridge Island, Washington Territory: the rainfall, 0.01, for August, 1885, is the least recorded during the last eight years.

Beloit, Rock county, Wisconsin: the rainfall, 9.23, for August, is the largest recorded in any corresponding month since 1851; in that year the amount was 9.85, and in 1850 it was 15.73.

HAIL.

Toledo, Ohio: at Manhattan, four miles northeast of station, considerable hail fell on the 1st; the width of the storm's path is reported to have been about one-half mile.

Rondout, Ulster county, New York: a severe hail storm occurred here on the 1st. The hail-stones were about the size of hickory nuts, and caused much damage, especially to crops.

Lancaster, Lancaster county, Pennsylvania: a severe hail storm occurred in the northern part of this county during the afternoon of the 1st; much damage was done to the tobacco crop.

Portsmouth, North Carolina, 4th: reports from New Berne state that a severe hail storm occurred at that place on the 1st.

Davenport, Iowa: at about 6 p. m. on the 3d a violent hail storm occurred to the northeast of this city, in Duck Creek Valley. All crops over an area about two miles wide by five miles long were completely destroyed. The storm caused damage estimated at $50,000.

Neillsville, Clark county, Wisconsin: a destructive hail storm occurred between 3.20 and 4 p. m. on the 3d. The hail-stones were unusually large, some of them measuring several inches in diameter. The storm moved in a southeasterly direction.

Guttenberg, Clayton county, Iowa: hail-stones of remarkably large size fell south of this place on the 3d.

Fort Totten, Dakota: a heavy rain and hail storm prevailed from 4.30 to 4.45 p. m. on the 7th, the hail-stones measuring two inches in diameter.

Table of excessive and greatest monthly precipitation for August, 1885.

Station.	Specially heavy.		Largest monthly.
	Date.	Amt.	Amount.
Alabama.			
Mobile			6.07
Arkansas.			
Lead Hill	1	2.37	
Magnolia	2	2.30	
Texarkana	2	2.17	
Colorado.			
West Las Animas	24, 25	2.34	
Connecticut.			
Hartford	3, 4	3.43	8.84
Do	24, 25	2.88	
New Haven	3, 4	4.51	8.13
New London	24, 25	4.11	7.69
Voluntown	3	2.25	6.55
Do	24	2.50	
Bethel	3, 4	3.20	
North Colebrook	3, 4	3.10	
Dakota.			
Yankton	5 to 8	3.84	6.21
Fort Randall	7	2.68	
Fort Bennett	1	2.27	
Dist. of Columbia.			
Distrib. Reservoir	3, 4	3.65	7.31
Washington City	2, 3	2.21	6.49
Receiv'g Reservoir	3, 4	2.95	
Florida.			
Pensacola	2, 3	2.12	11.74
Do	29, 30	6.81	
Merritt's Island	12, 13	3.43	10.28
Do	15, 16	3.06	
Archer	29, 29	2.26	10.23
Cedar Keys	12 to 15	5.82	10.09
Tallahassee	9	2.00	9.87
Do	30	3.22	
Live Oak	27	2.30	9.71
Saint Augustine	15, 16	2.29	8.67
Mayport	24	3.74	7.59
Jacksonville	28, 29	3.57	7.56
Fernandina	24	2.00	7.47
Sanford			6.75
Georgia.			
Savannah	26, 27	3.01	14.38
Do	30, 31	4.74	
Jesup	18	2.16	11.68
Do	31	2.74	
Way Cross	31	4.00	8.89
Thomasville	31	2.99	8.19
Allapaha	15	2.01	7.90
Do	31	2.50	
West Point	10	2.25	7.76
Do	30, 31	2.10	
Milledgeville	1, 2, 3	2.70	7.70
Do	26	3.06	
Athens	30	3.42	7.05
Newnan	30, 31	3.85	6.95
Atlanta	29, 30	5.14	6.92
Millen	29	2.03	6.87
Columbus	10, 11	2.50	6.64
Do	31	2.00	
Griffin	30, 31	4.38	
Cartersville	30	2.45	
Washington	30	2.35	
Camak	30, 31	2.20	
Illinois.			
Chicago	2, 3	6.36	11.28
Do	23, 24	3.92	
Windsor	2	2.50	11.02
Do	21, 22	3.37	
Do	25	2.36	
Sycamore	2	2.00	9.90
Do	8, 9	2.00	
Rockford	23, 24	4.13	9.18
Mattoon	25	2.00	7.80
Wilton Centre	2	5.24	7.79
Sandwich	1, 2	2.60	6.99
Riley	23, 24	2.93	6.80
Charleston	21, 22	2.23	6.47
South Evanston	23, 24	3.12	
Anna	34, 25	2.07	
Swanwick	5, 6	2.01	
Springfield	2	2.10	
Do	24, 25	2.09	
Indiana.			
Columbus	6	3.80	7.86
Sunman	6, 7	2.34	7.48
Greencastle	21, 22	2.04	7.24
Indianapolis	24, 25	2.44	
Richmond	21	2.11	
La Grange	1, 2	2.85	
Laconia	1	2.00	
Indian Territory.			
Fort Sill	13	2.90	
Do	26, 27	2.53	
Iowa.			
Davenport	1, 2	4.78	12.68
Do	23, 24	6.33	
Cedar Rapids	1, 2	3.08	9.19
Do	22, 23, 24	4.30	
Monticello	22, 23, 24	3.80	8.54
Dubuque	23, 24	4.45	8.02
Indianola	1, 2	2.38	7.98
Do	22, 23, 24	4.22	
Manchester	22, 23, 24	3.53	7.71
West Union	1, 2	1.94	7.58
Muscatine	22, 23, 24	6.35	7.38
Iowa—Con.			
Independence	23, 24	3.80	7.10
Oskaloosa	22	3.00	7.09
Do	23, 24	2.96	
Keokuk	1, 2	2.48	
Des Moines	23, 24	2.52	
Fort Madison	23, 24	2.50	
Logan	5, 6	2.00	
Kansas.			
Wyandotte	11	5.10	7.86
Independence	4, 5	3.00	7.46
Do	10	2.53	
Leavenworth	11	3.50	
Topeka	11	2.54	
W. Leavenworth	11	3.50	
Salina	3	2.05	
Louisiana.			
Luling	21, 22, 23	4.71	8.39
Grand Coteau	26	3.12	7.57
Lafayette			6.76
Point Pleasant	12	2.03	
Maine.			
Buckfield	4	2.30	11.10
Do	13	5.75	
Orono	4, 5	2.85	7.36
Do	13	3.04	
Cornish	4	2.15	6.08
Portland	4	2.11	
Maryland.			
Fallston	3	5.96	10.75
Do	7, 8	2.14	
Baltimore	3	3.35	7.78
Do	7, 8	2.14	
Fort McHenry	1, 2, 3	3.52	7.70
Woodstock	2, 3	2.41	6.43
Do	7, 8	2.40	
Great Falls	3, 4	3.10	6.03
Massachusetts.			
Amherst *a*	1	2.15	8.31
Do	3, 4	2.31	
Leicester	1 to 4	3.84	7.71
Boston	1	2.53	7.64
Amherst *b*	1	2.03	7.62
Do	3, 4	2.21	
Rowe	30, 31	2.00	7.37
Westborough	1	2.38	7.19
Princeton	4	2.48	6.89
Williamstown	30, 31	3.03	6.66
Worcester	1	1.94	6.52
Readville			6.28
New Bedford	24, 25, 26	3.09	
Fall River	24, 25, 26	2.10	
Michigan.			
Kalamazoo	23, 24	2.56	8.94
Alpena	3	2.26	7.18
Traverse City			6.95
Lansing	2	2.25	6.75
Do	23, 24	1.97	
Minnesota.			
Northfield	11	2.70	
Mississippi.			
Natchez	2, 3	2.15	8.85
Do	17	2.58	
Missouri.			
Independence	14	7.61	9.36
Pierce City	12	2.20	7.20
Do	21, 22	2.50	
Do	24, 25	2.10	
Lamar	24, 25	2.26	7.04
Greenfield			7.00
Miami			6.43
Nebraska.			
Stockham			7.75
Omaha	5, 6	2.06	
New Hampshire.			
Mt. Washington	3, 4	4.77	14.26
Do	13, 14	3.72	
Woodstock	3, 4	2.50	12.92
Do	11, 12, 13	7.18	
Bristol	14	2.25	8.58
Lake Village	1	3.28	7.97
Wolfeborough	4	2.83	7.68
Wier's Bridge	1	3.22	7.42
Ashland			6.51
Antrim	3, 4	2.00	6.00
New Jersey.			
Salem	3	3.80	10.09
South Orange	2, 3	4.60	7.55
Phillipsburg	3	4.03	7.35
Dover	3, 4	2.85	7.00
Beverly	2, 3	3.66	6.83
Paterson	3	2.37	6.48
Barnegat City	23	2.52	6.14
Princeton	2, 3	2.39	
New York.			
Buffalo	3, 4, 5	3.69	10.63
Do	21, 22	2.66	
Humphrey	3	2.02	10.11
Do	23, 24	3.60	
Cooperstown	21, 22	2.10	9.08
White Plains	3	3.10	8.30
Do	23, 24	3.10	
Menand Station	21, 22	2.33	8.91
Ithaca			8.14
Mountainville	3, 4	3.80	7.86

Table of excessive and greatest monthly precipitation for August, 1885—Cont.

Station.	Specially heavy.		Largest monthly.
	Date.	Amt.	Amount.
New York—Con.			
New York City	2, 3	4.14	7.70
Albany			7.58
West Point	4	2.60	7.50
Do	14	2.00	
Setauket	3, 4	4.16	6.43
Auburn			6.33
David's Island	3	2.40	
North Carolina.			
Fort Macon	25, 26	2.18	7.73
Do	29, 30	2.43	
Raleigh	28, 29, 30	5.80	6.40
Goldsborough	30, 31	4.24	
New Berne	30, 31	2.57	
Hatteras	25, 26	2.00	
Ohio.			
Wellsborough	12, 13	4.98	15.25
Do	24, 25	5.55	
Quaker City	23	4.08	9.86
McConnelsville	2, 3	2.60	9.62
Tiffin	1, 2	3.48	9.39
Wilmington	2, 3	2.72	9.30
Do	22, 23	2.22	
Marietta	2	4.05	8.99
Logan	2	2.74	8.75
Waynesville	2	2.15	8.59
Springborough	21 to 25	4.03	8.22
North Lewisburg	23, 24	3.20	7.55
Weymouth	12, 13	3.23	7.52
Washington C.H.	2, 3	3.21	7.49
Do	25	2.96	
Garrettsville	2, 3	2.32	7.44
Upper Sandusky	1, 2	2.00	7.05
Levering'	24	2.15	6.99
New Alexandria			6.84
Clintonville	23, 24	2.04	6.75
Lordstown	23, 24	2.05	6.71
Hiram	2	2.07	6.66
Ellsworth			6.49
Yellow Springs	24, 25	2.32	6.47
Ruggles			6.35
Warren			6.35
Youngstown	23, 24	2.08	6.34
Dayton	24, 25	2.31	6.23
Clyde	9	2.10	6.22
Hudson			6.03
Pomeroy	3	3.31	6.03
Westerville	24, 25	2.66	
Cincinnati	6, 7	2.62	
Pennsylvania.			
Mahanoy Plane	1, 2, 3	5.23	9.99
West Chester	2, 3	6.56	9.51
Blooming Grove	3	4.80	9.20
Do	24, 25	2.40	
Germantown	1, 2, 3	6.39	8.80
Dyberry	3	3.60	8.77
South Bethlehem	2, 3	4.10	8.64
Quakerstown	3	4.07	8.34
Grampian Hills	2, 3	2.40	8.03
Erie	23, 24	2.90	7.97
Easton	1, 2, 3	5.21	7.76
Pennsylvania—Con.			
Fallsington	3	3.38	7.56
Drifton	3	2.30	7.44
Catawissa	1, 2, 3	2.07	7.30
Philadelphia	2, 3	3.72	6.80
Pittsburg	2, 3	2.01	
Altoona	3	2.58	
Chambersburg	2, 3	2.50	
Rhode Island.			
Narragansett P'r	24, 25	3.74	6.90
South Carolina.			
Charleston	16	2.05	19.18
Do	25	4.29	
Do	29, 30, 31	7.58	
Hardeeville	24, 25	4.12	17.01
Do	31	6.00	
Yemassee	14	2.05	14.72
Do	25	2.15	
Do	29	2.00	
Do	31	2.00	
Jacksonburg	25	2.98	10.71
Do	31	3.39	
Kingstree	3	3.24	10.19
Do	25	2 40	
Branchville	1, 2	2.53	7.24
Do	25	2.03	
Florence	2	3.10	7.22
Do	25	3.28	
Greenville			6.39
Saint George's			6.33
Greenwood	30	3.59	
Cheneyville	1, 2	2.23	
Chester	30, 31	2.00	
Saint Matthew's	2	2.00	
Tennessee.			
Ashwood	12	2.80	
Texas.			
Huntsville	14	3.00	
Sour Lake	11, 12	2.16	
Weatherford	27	2.00	
Cuero	14	2.00	
Utah.			
Frisco	22, 23	2.80	
Vermont.			
Woodstock	13	3.04	8.48
Strafford	12, 13	2.00	7.90
Brattleborough	3, 4	2.00	6.34
Lunenburg	13, 14	2.50	
Dorset	13	2.03	
Virginia.			
Bird's Nest	7, 8	6.45	7.05
Bruington	7, 8	2.70	
West Virginia.			
Wellsborough			7.45
Wisconsin.			
Beloit	1, 2	2.04	9.23
Do	23, 24	2.72	
Milwaukee	6	2.09	7.39
Madison			6.41
Franklin	6	2.50	6.06

Annapolis, Maryland: a severe hail storm visited sections of Anne Arundel county on the 19th. The storm was especially severe in the vicinity of Davidsonville, where much damage was done to the corn and tobacco crops.

Easton, Pennsylvania: a destructive hail storm occurred in this vicinity during the afternoon of the 19th. Great damage was done to the growing crops and fruit in the northern part of this (Northampton) county.

Danville, Montour county, Pennsylvania: a violent hail storm occurred here during the afternoon of the 21st, the hail-stones measuring one and one-half inches in diameter.

Catawissa, Columbia county, Pennsylvania: one of the most violent hail storms that has ever visited this vicinity occurred on the 21st, the largest of the hail-stones measuring more than one inch in diameter. The width of the storm's path was about one mile. The crops were seriously damaged.

Lock Haven, Clinton county, Pennsylvania: a destructive hail storm passed over the townships of Dunstable, Wayne, Pine Creek, and Woodward, in this county, during the afternoon of the 22d. The tobacco crop in its track was totally destroyed.

Hartford, Connecticut: a violent storm, accompanied by hail, occurred at Bloomfield, six miles northwest of Hartford, on the 24th. A large amount of damage was done, the tobacco crop on many farms being entirely destroyed.

Cape Henlopen, Delaware: hail-stones as large as walnuts fell for a few minutes during the afternoon of the 25th.

Rochester, New York: a severe hail storm occurred at Corning, Steuben county, between 8 and 9 p. m. on the 30th. Reports from Onondago county state that a destructive hail storm occurred in the northern part of that county on the above date, the unharvested tobacco crop being almost entirely ruined. During the early morning of the 31st a very severe hail storm passed over Batavia, Genesee county, the hail-stones covering the ground to a depth of three inches. Much damage was done to crops.

West Las Animas, Colorado: on the 24th heavy rain fell between 7.50 and 8.55 p. m., and from 8.10 to 8.40 p. m. the storm was accompanied by hail. In the surrounding country the alfalfa and millet crops and garden vegetables were beaten to the ground, and on the prairies many small animals and birds were killed. The rainfall and melted hail amounted to 1.92 inches, the greater part of which fell in thirty minutes. The wind reached a velocity of thirty-three miles per hour at West Las Animas. This storm is considered one of the most severe that has ever occurred in that vicinity.

Hail-storms, of which no particulars were reported, occurred in the various states and territories, as follows:

Arizona.—Fort Apache, 3d; Fort Verde, 5th.

Colorado.—Pueblo, 1st, 29th; Braddock, 6th, 27th; Pike's Peak, 10th, 11th, 15th, 23d.

Connecticut.—North Colebrook, 19th; Hartford, 24th.

Dakota.—Fort Sully, 1st, 6th; Forts Totten and Bennett, 7th; Bismarck, 9th.

Illinois.—Cairo, 2d; Chicago, 3d; Windsor, 7th.

Iowa.—Dubuque, 3d; West Union, 17th; Keokuk, 18th.

Kansas.—Westmoreland and Yates Centre, 3d; Maud and Sterling, 14th.

Massachusetts.—Worcester, 1st.

Minnesota.—Saint Vincent, 2d; Moorhead, 4th; Saint Paul and Fort Snelling, 16th.

Montana.—Forts Benton and Maginnis, 26th.

Nebraska.—Columbus, 5th; Crete, 23d.

New Jersey.—Beverly, 25th.

New Mexico.—Lava, 28th; Gallinas Springs, 30th, 31st.

New York.—Rochester, 14th; Palermo, 18th, North Volney, 19th; Buffalo, 21st; Humphrey, 27th; Ithaca, 30th.

Ohio.—Wauseon, 1st, 4th; Tiffin, 30th.

Pennsylvania.—Quakertown and Dyberry, 1st; Wellsborough, 4th, 13th; Drifton, 5th.

South Carolina.—Stateburg, 8th.

Tennessee.—Milan, 1st; Knoxville, 16th.

Utah.—Salt Lake City, 25th.

Virginia.—Fort Myer, 19th.

Wisconsin.—Beloit, 6th; La Crosse, 17th; Milwaukee, 17th, 21st.

Wyoming.—Fort Bridger, 5th, 8th; Fort Fred Steele, 28th.

SNOW.

Snow is reported to have fallen during the month at the following places:

Pike's Peak, Colorado, 12th, 17th, 18th, 20th, 25th, 27th, 28th. The observer also reports that at the close of the month traces of snow remained on the sides of the mountain.

Hartford, Connecticut: snow fell at this place on the 26th; this is the earliest fall of snow ever recorded in August.

Mount Washington, New Hampshire, 26th, 28th, 29th.

Wilkesbarre, Pennsylvania: at Harvey's Lake, ten miles distant, snow fell at intervals all day on the 26th.

SLEET.

The occurrence of sleet during the month has been reported from but one station, viz., Pike's Peak, Colorado, on the following dates, 4th, 5th, 11th, 12th, 13th, 19th, 20th, 21st, 23d to 27th, 29th, 30th 31st.

PRECIPITATION FROM CLOUDLESS SKY.

Lead Hill, Arkansas, 10th: at about 11 p. m. a light sprinkle of rain fell; the sky was partly cloudy in north and northwest, but it was entirely clear over head, and the air calm.

COTTON REGION REPORTS.

The following table shows the means of the maximum and minimum temperatures, and the average rainfall for the several cotton districts, for the month of August, 1885, together with the averages for the three preceding years:

Temperature and rainfall data for the cotton districts. August, 1885.

Districts.	Rainfall.			Temperature.							
				Maximum.			Minimum.			Extremes for Aug., 1885.	
	Average for Aug. of three preceding years.	Average for Aug., 1885.	Departures.	Mean for Aug. of three preceding years.	Mean for Aug., 1885.	Departures.	Mean for Aug. of three preceding years.	Mean for Aug., 1885.	Departures.	Max.	Min.
				°	°	°	°	°	°	°	°
New Orleans	4.34	3.58	— 0.76	91.1	91.1	0.0	70.6	72.6	+ 2.6	101	60
Savannah	5.35	6.92	+ 1.57	90.7	91.0	+ 0.3	70.7	72.5	+ 2.5	101	60
Charleston	5.94	11.39	+ 5.45	89.0	89.5	0.0	68.8	69.7	+ 0.9	99	58
Atlanta	4.36	5.33	+ 0.97	87.6	88.7	+ 1.1	67.0	68.8	+ 1.8	98	58
Wilmington	4.32	4.05	— 0.27	88.2	88 4	+ 0.2	67.3	67.3	0.0	100	51
Memphis	3.15	1.10	— 2.05	87.9	90.7	+ 2.8	65.6	67.2	+ 1.6	103	45
Galveston	2.65	1.34	— 1.31	94.0	94.2	+ 0.2	70.1	71.9	+ 1.8	105	48
Vicksburg	3.53	1.91	— 1.62	90.7	91.0	+ 0.3	69.1	69.3	+ 0.2	99	47
Montgomery	3.27	3.55	+ 0.28	90.2	90.9	+ 0.7	67.8	69.5	+ 1.7	104	56
Augusta	3.64	4.31	+ 0.67	89.8	91.2	+ 1.4	67.5	69.3	+ 1.7	107	58
Little Rock	2.77	1.49	— 1.28	90.1	92.6	+ 2.5	65.2	67.1	+ 1.9	104	45
Mobile	2.99	2.85	— 0.14	92.0	92.6	+ 0.6	68.8	71.0	+ 2.2	100	49

The rainfall, as compared with the average for the three preceding years, is excessive in the districts of Atlanta, Augusta, Charleston, Montgomery, and Savannah; it was deficient in the remaining districts. The most marked departures are +5.45 for the district of Charleston, and —2.05 for the district of Memphis.

The means of the maximum and minimum temperatures were normal, or slightly above, in all districts.

TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly ranges of water temperature; the average depth at which the observations were made; and the mean temperature of the air:

Temperature of water for August, 1885.

Station.	Temperature at bottom.		Range.	Average depth, feet and tenths.	Mean temperature of the air at station.
	Min.	Max.			
	°	°	°		°
Atlantic City, New Jersey	81.6	73.4	8.2	5.0	73.1
Alpena, Michigan	73.6	58.1	15.5	12.9	59.1
Augusta, Georgia	83.5	74.4	9.1	6.1	79.2
Baltimore, Maryland	85.1	77.0	8.1	10.7	74.6
Block Island, Rhode Island	69.4	62.2	7.2	0.3	68.7
Boston, Massachusetts	70.9	59.7	11.2	20.4	67.4
Buffalo, New York	77.0	67.2	9.8	9.1	64.7
Canby, Fort, Washington Territory	67.9	59.1	8.8	15.1	57.8
Cedar Keys, Florida	88.7	80.1	8.6	8.8	82.0
Charleston, South Carolina*	85.4	75.4	10.0	37.5	80.6
Chicago, Illinois †	71.5	63.7	7.8	8.4	68 1
Chincoteague, Virginia	85.0	72.3	12.7	3.7	75.0
Cleveland, Ohio	75.3	67.1	8.2	14.0	65.8
Detroit, Michigan	76.0	63.7	12.3	24.6	66.7
Duluth, Minnesota	67.5	59.1	8.4	10.3	60.9
Eastport, Maine	52.5	48.1	4.4	16.4	60.1
Escanaba, Michigan	74.3	56.3	18.0	18.2	59.6
Galveston, Texas	87.5	83.7	3.8	12.7	84.2
Grand Haven, Michigan	74.8	64.1	10.7	19.0	60.8
Indianola, Texas	87.3	83.3	4.0	8.6	82.8
Jacksonville, Florida	89.0	82.0	7.0	18.0	80.7
Key West, Florida	90.5	86.2	4.3	17.4	85.1
Mackinaw City, Michigan	69.6	59.2	10.4	10.0	59.3
Macon, Fort, North Carolina	84.3	77.7	6.6	12.6	78.8
Milwaukee, Wisconsin	65.5	55.0	10.5	8.0	63.1
Mobile, Alabama	87.5	83.0	4.5	16.1	79.0
New Haven, Connecticut	77.4	70.3	7.1	16.7	67.8
New London, Connecticut	72.0	66.2	5.8	11.9	68.4
New York City	77.8	72.1	5.7	15.7	70.8
Norfolk, Virginia	84.4	74.7	9.7	10.5	77.9
Pensacola, Florida	87.2	79.4	7.8	17.4	80.8
Portland, Maine	66.1	56.6	9.5	16.7	64.1
Portland, Oregon	75.4	67.3	8.1	49.8	66.5
Sandusky, Ohio	81.0	66.4	14.6	11.8	67.5
Sandy Hook, New Jersey	76.6	72.2	4.4	2.2	71.8
San Francisco, California‡	63.7	60.0	3.7	37.1	58.5
Savannah, Georgia	86.0	79.2	6.8	10.3	81.1
Smithville, North Carolina	87.1	74.8	12.3	10.9	79.5
Toledo, Ohio	81.1	67.4	13.7	13.7	66.9
Wilmington, North Carolina	87.3	73.0	14 3	13.9	79.7

* Record for 29 days. † Record for 16 days. ‡ Record for 27 days.

WINDS.

The most frequent directions of the wind during August, 1885, are shown on chart ii by arrows flying with the wind. Along the Atlantic coast the prevailing directions were mostly south or southwest; in the lower lake region, Ohio Valley and Gulf States, variable; in the upper lake region, upper Mississippi and Missouri valleys, mostly north or northwest; in the Rocky Mountain and Pacific coast regions, variable.

HIGH WINDS.

(In miles per hour.)

On the summit of Mount Washington, New Hampshire, winds of fifty or more miles per hour occurred during the month, as follows: 80, s., 3d; 92, s., 4th; 50, nw., 5th; 54, sw., 13th; 75, nw., 14th; 68, n., 15th; 60, nw., 19th; 62, nw., 20th; 55, sw., 21st; 78, nw., 22d; 58, nw., 23d; 56, nw., 25th; 58, nw., 26th.

Other stations registering wind-velocities of fifty miles or more per hour are as follows:

Sandy Hook, New Jersey, 50, se., 3d.
Pike's Peak, Colorado, 54, nw., 6th.
Sandusky, Ohio, 63, nw., 9th.
Smithville, North Carolina, 98, s. and sw., 25th.
Savannah, Georgia, 56, nw., 25th.
Wilmington, North Carolina, 52, sw., 25th.
Kitty Hawk, North Carolina, 50, n., 25th.
Charleston, South Carolina, hurricane, se., 25th.
Fort Macon, North Carolina, 92, sw., 25th; 68, sw., 26th.
Fort Maginnis, Montana, 63, ne., 26th.
Hatteras, North Carolina, 52, s., 26th.

LOCAL STORMS AND TORNADOES.

Davenport, Iowa: during the afternoon of the 1st a heavy rain and thunder-storm passed over this place in a direction from northeast to southwest. Several houses were struck by lightning, and the roof of the Chicago, Rock Island and Peoria freight office was blown off.

Milan, Gibson county, Tennessee: a tornado occurred five miles east of this place on the 1st; it pursued an easterly course, blowing down buildings and destroying crops in its path, which was about two hundred yards wide and one-half mile long. Hail-stones of considerable size accompanied the storm.

Bethlehem, Northampton county, Pennsylvania: a violent thunder-storm, accompanied by hail and very heavy rain, passed north of this place between 4 and 5 p. m. on the 1st. The heavy rainfall caused much damage to railroads and other property.

Frederick, Frederick county, Maryland: a severe storm prevailed on the 2d; it began about 6 p. m. and continued until past midnight. The very heavy rainfall caused the overflow of Carroll Creek, resulting in the flooding of a large part of the town. The damage is estimated at $15,000. Reports from various parts of the county state that much damage was done by the heavy rains, and that in many cases the county roads were rendered impassable.

Elkton, Cecil county, Maryland: during the night of the 2–3d a tornado occurred about four miles southwest of Elkton, its path being about one hundred yards wide. Many trees were blown down and several buildings damaged. The tornado is reported to have been of only a few minutes' duration and was accompanied by a loud, roaring sound. The heaviest rain storm of the season occurred on the 3d.

Westminster, Carroll county, Maryland: the heaviest rain storm experienced in this vicinity for many years occurred during the night of the 2–3d. Rain began at about 7 p. m. and continued until 10 a. m. Great damage was done to crops, bridges, and other property.

Cambridge, Dorchester county, Maryland: at about 7 p. m. on the 3d a tornado passed through the lower part of this county. The country through which the tornado passed is mostly marsh land and but thinly populated, otherwise the damage, which was slight, would have been much greater. A few buildings were destroyed.

Wilmington, Delaware: reports from Smyrna, Kent county, state that a tornado occurred on the afternoon of the 3d. Its path was about three hundred feet wide, and several miles in length. Much damage was done to orchards and crops.

Readington, Hunterdon county, New Jersey: the heavy rain and wind storm on the 3d caused damage in this county, estimated at $40,000.

Buffalo, New York: a gale prevailed from 7.25 p. m. on the 3d to 5.10 p. m. on the 4th; a maximum velocity of forty-three miles from the southwest occurred at 8.25 a. m. on the latter date.

New York City: a southerly gale prevailed from 2.15 to 9.45 p. m. on the 3d, causing much damage on the Long Island and New Jersey coasts. The heavy rainfall resulted in flooding many cellars in Brooklyn and Jersey City.

Sandy Hook, New Jersey, 3d: a strong southeasterly gale prevailed from 2 a. m. to 11 p. m., the wind reaching a maximum velocity of fifty miles per hour.

Erie, Pennsylvania: the high winds on the 3d caused much damage to crops in this vicinity.

Reading, Pennsylvania: the storm of the 3d was very severe, and caused considerable damage in Berks county.

The Signal Service observer at Philadelphia, Pennsylvania, reports, concerning the tornado which occurred on the 23d, as follows:

The day opened with fresh easterly winds and a threatening appearance of the sky, the barometer, at the morning observation, reading about one-tenth of an inch lower than on the previous morning. Rain began at 11.35 a. m., and continued throughout the day, and at intervals fell heavily. At 2.20 p. m. thunder was heard in the northwest, being loudest about 2.35 p. m. At 3 p. m. a very heavy shower fell, lasting twenty minutes. At 3.15 the wind, which had been blowing steadily from the southeast all day, shifted to west-northwest, and blew with considerable force for about three minutes, afterward shifting back to the southeast. About this time the tornado passed up the Delaware River from the vicinity of Red Bank, New Jersey, striking Philadelphia, near Greenwich Point, where it demolished a portion of the works of the Pennsylvania Salt Company; thence the tornado crossed the river, wrecking the steamers "Major Reybold" and "Peerless." After striking the New Jersey shore the tornado passed along the river front from Dialogue's shipyard to Bridge avenue, Camden, and northward through the latter city, causing great destruction to property. More than five hundred dwelling houses were unroofed or blown down in that part of Philadelphia known as Port Richmond, and in Camden. The damage is estimated at more than $500,000. Six persons were killed and more than one hundred injured. The tornado is described by those who witnessed its passage across the river, as an immense, black, funnel-shaped cloud nearly resting upon the water and extending to the rain clouds above it. It was accompanied by a terrific noise, similar to the sound of escaping steam. The course of the storm was in a straight line N. 22° E. from Greenwich Point to Port Richmond, a distance of eight miles, which was traversed in about sixteen minutes. The path of destruction varied from one to two squares in width, that part of it on the south side of the tornado's track being much greater than that on the opposite side. No rain fell in the immediate path of the tornado during its progress, but in about half an hour afterward heavy rain fell, which caused a large amount of damage, principally to effects belonging to the partly destroyed buildings.

Oberlin, Decatur county, Kansas: a violent storm occurred at this place during the afternoon of the 3d; the wind attained an estimated velocity of seventy-five miles per hour from the east. The storm moved in a southeasterly direction.

Fort Verde, Arizona: a heavy rain storm, accompanied by high wind and hail, occurred during the afternoon of the 5th. A number of trees and telegraph poles in this vicinity were prostrated.

San Carlos, Arizona: reports from Glove City, in this territory, state that the severest wind, rain, and hail-storm ever known at that place occurred on the 5th. Buildings were unroofed, and other damage caused.

Omaha, Nebraska: reports state that a tornado passed down Loup Creek valley during the night of the 5–6th, causing much damage at Ord, Valley county. The storm was of about twenty minutes' duration.

Nephi, Juab county, Utah: the thunder-storm of the 6th was the severest ever known at this place. Numerous washouts occurred along the Utah Central railroad in Utah county.

Fargo, Dakota: a remarkably heavy fall of rain occurred

here during the afternoon of the 7th, causing great damage to crops.

Bird's Nest, Northampton county, Virginia: the rainfall accompanying the storm of the 8th was remarkably heavy, more than six inches having fallen.

Racine, Wisconsin: a violent electrical storm prevailed at this place during the night of the 8–9th; much damage was done by lightning. The storm was accompanied by very heavy rainfall, which caused a large amount of damage to crops.

Tiffin, Seneca county, Ohio: a severe storm prevailed in this vicinity on the 9th. Some buildings were unroofed and much timber was destroyed.

Sandusky, Ohio: a very severe storm prevailed here during the afternoon of the 9th. It began about 3 p. m., with very sharp lightning, thunder, and heavy rainfall. From 3.03 to 3.32 p. m. the wind blew at the rate of sixty-three miles per hour. A large amount of damage was done throughout the city.

Kansas City, Missouri: a heavy rain storm occurred during the early morning of the 11th, flooding cellars and streets in all parts of the city. Two brick buildings were undermined and other damage caused.

Albany, New York: a heavy rain storm occurred on the 12th at Hoffman's Ferry, a station on the New York Central and Hudson River railroad, about forty miles west of Albany, causing great damage to the crops in that vicinity, and washing away about three hundred feet of the railroad track. The losses sustained will aggregate several thousand dollars.

Schenectady, Schenectady county, New York: a violent storm occurred at Glenville, about six miles distant, during the afternoon of the 12th. It was accompanied by a remarkably heavy rainfall, which caused much damage to railroads and other property.

Norwood, Saint Lawrence county, New York: a tornado occurred at this place about 5 p. m. on the 12th. Many buildings and trees were blown down, and the Ogdensburg and Lake Champlain railroad bridge, nearly three hundred feet long, was carried a distance of from thirty to forty feet and dropped into the river. Two persons were killed and many injured, The losses are variously estimated at from $50,000 to $200,000.

Reading, Pennsylvania: during the night of the 13–14th a very heavy fall of rain occurred over Greenwich township, in this county. The storm was of about one hour's duration, and was confined to a small area. The Schuylkill River rose four feet.

New York City: on Long Island barns were blown down and dwellings unroofed by the storm during the night of the 13–14th.

Rochester, New York: a severe storm of wind, rain and hail passed over the mouth of the Irondequoit Bay at about 6 a. m. of the 14th. It was of very short duration, the most violent part lasting about five minutes.

Independence, Jackson county, Missouri: more than seven and one-half inches of rain fell at this place on the 14th.

San Diego, California: reports from Mesa Grande, about sixty miles to the eastward of San Diego, state that on the 14th an unusually violent storm visited that vicinity and caused a large amount of damage to orchards and crops. The storm was accompanied by very heavy rain, and hail of considerable size. A large number of orchard trees were uprooted and many tons of ripe fruit destroyed.

Cœur d'Alene, Idaho: a severe southwesterly storm prevailed at this place between 11 and 11.55 p. m. on the 18th. Trees one and one-half feet in diameter were blown down or broken off by the high wind. The path of the storm is reported to have been about one mile in width.

Erie, Pennsylvania: a very severe thunder-storm prevailed from 11.30 p. m. of the 18th to 1 a. m. of the 19th, the electrical discharges being very unusual; a number of times during the storm all of the electric lights in the city were extinguished. Dwellings, barns, fences, etc., were blown down by the high winds. Heavy losses are reported from the surrounding country.

Charleston, South Carolina, 24th: reports state that on the 20th a violent storm passed over Darlington, unroofing buildings and causing other damage.

Chicago, Illinois: during a thunder-storm on the night of the 20–21st, a large mercantile establishment in this city was struck by lightning and set on fire, resulting in a loss estimated at between $40,000 and $50,000.

Rochester, New York, 21st: from 9 to 10.30 p. m., one of the most remarkable electrical storms known for many years prevailed, the flashes of lightning being very vivid and almost continuous. At 10 p. m. the wind reached a velocity of twenty-eight miles per hour.

Scranton, Lackawanna county, Pennsylvania: during the afternoon of the 21st this place was visited by a severe storm, which blew down trees, out-buildings, etc., in the western part of the town.

Buffalo, New York: the most severe and destructive electrical storm of the season passed over the city in a direction from southwest to northeast at 7 p. m. of the 21st. The lightning was almost continuous, and caused considerable damage to telegraph lines. From 9.30 a. m. to 11.30 p. m. high winds prevailed, a maximum velocity of forty-two miles from the west occurring at 8.15 p. m.

Auburn, New York: the storm which occurred during the night of the 21–22d was one of the severest that has occurred for many years.

Menand Station, (near Albany), New York: on the 22d, 2.20 inches of rain fell in nine hours. Much damage was done to crops; and the roadways were badly washed.

Cincinnati, Ohio: a destructive storm occurred during the afternoon of the 22d. The wind reached a velocity of thirty-one miles per hour, and for five minutes it blew at the rate of thirty-nine miles. The rainfall for fourteen minutes amounted to 0.77 inch. This storm caused damage estimated at from $27,000 to $28,000.

Frisco, Utah: a "cloud-burst" occurred on a ridge of mountains about three miles and a half northwest of this station, at about 9 p. m. on the 22d. The water is reported to have rushed down the sides of the mountain with such force that large boulders were displaced and small trees torn up.

Hartford, Connecticut: a destructive storm occurred to the north and west of this place on the 24th.

New London, Connecticut: an unusual electrical storm occurred during the afternoon of the 24th. At 7.10 p. m. there was a flash of lightning which traversed the whole sky from west to east, making an illumination as bright as mid-day. The flash was followed by a report which caused houses to shake as if by an earthquake. This electrical discharge caused much damage to the telegraph and telephone wires in this vicinity; it also destroyed about twenty feet of a large water-main, allowing a column of water two feet in diameter to escape with such force as to ascend sixty feet into the air.

Saint Paul, Minnesota 28th: a special dispatch from Corning, Adams county, Iowa, states that the heaviest rainfall ever known in that vicinity occurred during the night of the 23-24th. More than three miles of track and much of the roadbed of the Chicago, Burlington, and Quincy railroad were washed out. The east and west branches of the Nodaway River rose to a height of six feet above any previous flood mark. The damage in that county, independent of that sustained by the railroads, is estimated at $100,000.

Hopkinsville, Christian county, Kentucky: reports received on the 25th state that at about midnight of the 24-25th a tornado passed through the northern part of this county, causing a large amount of damage. Buildings, orchards, and forest trees for a distance of one-half mile were levelled, some trees three feet in diameter being broken off close to the ground. Several buildings were totally destroyed near Earlington, Hopkins county.

Salt Lake City, Utah: at 2.30 p. m. of the 25th a "cloud-burst" occurred at Hot Springs, on the northern border of this city, and somewhat later another occurred in City Creek Can-

on, about three miles northeast of station. A thunder-storm, accompanied by small hail, prevailed at Salt Lake City during the afternoon. Considerable damage was done to crops in the surrounding country.

Fort Maginnis, Montana: a severe storm prevailed from 4.50 to 6 p. m. on the 26th, the wind reaching a maximum velocity of sixty-three miles per hour. Very heavy rain and some hail accompanied the storm.

Tallahassee, Florida: trees and fences were blown down and the cotton crop seriously injured by the rain and wind storm of the 30th.

The following are reports of tornadoes which occurred during August, 1885, forwarded by special tornado observers of the Signal Service, of whom there are more than 1,400.

3d.—A tornado occurred at Camden, New Jersey, and Philadelphia, Pennsylvania, at 3.20 p. m. It pursued a north-northeasterly course for a distance of eight miles, its path being of an average width of 1,200 feet. The shortest time in passing a given point was thirty seconds, and its progressive movement is estimated at fifty miles per hour. Five hundred buildings were either destroyed or injured, and two steamers were wrecked; six persons were killed and nearly one hundred injured. The damage is estimated at $500,000. (See report of Signal Service observer at Philadelphia concerning this storm.)

3d.—At 4 p. m. a tornado started at a point one mile above Feasterville, Bucks county, Pennsylvania, and passed through Churchville and Richborough, ending at Pineville, a distance of eleven miles from where it first started. Its course was to the northward, and in its path five dwellings, seven barns, and many other out-buildings were destroyed. The shortest time in passing a given point was two minutes.

3d.—At 2.30 p. m. a tornado occurred at Thompsontown, Juniata county, Pennsylvania. It moved in a northeasterly direction for a distance of two miles, the width of its path being about 1,200 feet. But little damage was done.

3d.—A tornado occurred at Solebury, Bucks county, Pennsylvania, at 4.30 p. m. Its course was N. 35° E. Several buildings were destroyed or damaged, entailing a loss of $3,000.

3d.—A tornado occurred north of Lansdale, Montgomery county, Pennsylvania, at about 4 p. m. A number of buildings were destroyed or unroofed.

3d.—At 11.30 a. m. a tornado started at Lederachsville, Montgomery county, Pennsylvania, and passed through Lower Salford, ending near Sumneytown. Its course was N. 10° W.; several barns were destroyed.

3d.—A tornado occurred in Pacopsin township, West Chester county, Pennsylvania, at 5.30 p. m. The tornado-cloud was funnel-shaped and moved in a north-northeasterly direction for a distance of one and one-half miles. Several out-buildings were destroyed.

3d.—A tornado occurred near Milford, Bucks county, Pennsylvania; its path was about twenty feet in width, and the progressive movement about twenty miles per hour. Some out-buildings were destroyed.

3d.—A tornado occurred during the afternoon, at "The Hickory" near Bel Air, Harford county, Maryland. There were two tornado-clouds, both of which were funnel-shaped.

3d.—A tornado occurred in Cecil county, Maryland, at about noon. It passed through Elk Neck and New Leeds, and ended two miles above Cherry Hill. Its course was in a direction N. 12° E., for a distance of fourteen miles, the path being from three hundred to six hundred feet in width. A number of buildings were destroyed.

3d.—A tornado occurred on the Patapsco River, in Maryland, at 5.20 p. m. The tornado-cloud was funnel-shaped and moved in a northeasterly direction.

3d.—A tornado occurred at Buckstown, Dorchester county, Maryland, at 7 p. m. The tornado-cloud was funnel-shaped and moved in a northeasterly direction, its path being about sixty feet in width. A dwelling and barn were destroyed; damage $1,000.

3d.—At 4.45 p.m. a tornado passed from a point one-half mile southwest of McDonough, New Castle county, Delaware, to a point one mile south of Delaware City. The funnel-shaped tornado-cloud moved in a direction northeast by north for a distance of nine miles at an average velocity of twenty miles per hour. Two dwellings and a number of out-buildings were destroyed. The damage is estimated at $5,000.

3d.—A tornado occurred at Metomen, Fond du Lac county, Wisconsin, at 2.35 p. m. Its path was in a southeasterly direction for a distance of ten miles, and was about two hundred and fifty feet wide. Some out-buildings were destroyed.

5th.—A tornado occurred near Arrington, Atchison county, Kansas, at 1.25 p. m. Its course was in a direction east by north for a distance of one mile.

12th.—At 4.48 p. m. a tornado occurred at Norwood, Saint Lawrence county, New York, and moved in a direction E. 20° N. for a distance of fifteen miles, its path being one-half mile in width. The shortest time in passing a given point was from three to five minutes. Two persons were killed, ten injured, and property valued at $150,000, destroyed.

NAVIGATION.

STAGE OF WATER IN RIVERS.

In the following table are shown the danger-points at the various river stations; the highest and lowest stages for August, 1885, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, August, 1885.

[*Expressed in feet and tenths*]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, Louisiana	29 9	1	15 3	31	3 9	11 4
Arkansas River:						
Fort Smith, Arkansas	22 0	16	8 2	28	4 3	3 9
Little Rock, Arkansas	23 0	20	8 2	31	5 1	3 1
Missouri River:						
Yankton, Dakota	24 0	2	17 9	27, 28	15 5	2 4
Omaha, Nebraska	18 0	2	10 7	31	7 4	3 3
Leavenworth, Kansas	20 0	1	13 4	23, 24	9 5	3 9
Mississippi River:						
Saint Paul, Minnesota	14 5	1, 2	4 3	23 to 30	3 0	1 3
La Crosse, Wisconsin	24 0	1	8 0	31	4 5	4 1
Dubuque, Iowa	16 0	4, 5	9 6	31	5 7	3 9
Davenport, Iowa	15 0	4, 26	8 2	17 to 22	5 0	3 2
Keokuk, Iowa	14 0	29	12 0	21	5 5	6 5
Saint Louis, Missouri	32 0	15	19 6	26	12 9	6 7
Cairo, Illinois	40 0	17	20 5	29	14 3	6 2
Memphis, Tennessee	34 0	19, 20	13 8	31	9 2	4 6
Vicksburg, Mississippi	41 0	1	18 5	31	13 2	5 3
New Orleans, Louisiana*	—3 0	1	— 8 8	16, 17	—11 7	2 9
Ohio River:						
Pittsburg, Pennsylvania	22 0	26	12 3	2	1 4	10 9
Cincinnati, Ohio	50 0	31	19 7	1	7 5	12 2
Louisville, Kentucky	25 0	9	7 6	2	4 3	3 3
Cumberland River:						
Nashville, Tennessee	40 0	20	6 0	31	1 1	4 9
Tennessee River:						
Chattanooga, Tennessee	33 0	16	4 4	30, 31	1 3	3 1
Monongahela River:						
Pittsburg, Pennsylvania	29 0	26	12 3	2	1 4	10 9
Savannah River:						
Augusta, Georgia	32 0	31	10 0	27, 29	5 0	5 0
Mobile River:						
Mobile, Alabama	.....	9, 11, 30	16 8	20	15 0	1 8
Sacramento River:						
Red Bluff, California	.....	1 to 20	0 5	21 to 31	0 4	0 1
Sacramento, California	.....	1 to 11	7 8	26 to 31	7 3	0 5
Willamette River:						
Portland, Oregon	.....	1	6 0	20	3 6	2 4
Colorado River:						
Yuma, Arizona	.....	.....	.....	.....	.....	.....

* Below high-water mark of 1874 and 1883.

The observer at Chattanooga reports that navigation in the lower Tennessee River was suspended on the 25th, on account of low water.

HIGH TIDES.

New London, Connecticut, 3d: very high tide, flooding cellars and low grounds.

Cedar Keys, Florida, 9th to 12th.

Eastport, Maine, 14th, 15th, 16th.

New York City, 9th.

Portsmouth, North Carolina, 9th.

New River Inlet, North Carolina, 10th, 11th.
Fort Macon, North Carolina, 7th.

LOW TIDE.

Indianola, Texas, 1st.

FLOODS.

The floods of August, 1885, were of local character and were confined to the smaller rivers and streams, as will be seen from the following reports:

Chicago, Illinois: very heavy rain fell throughout the 2d; from 7 a. m. until 11 p. m. 5.49 inches of rain fell. A large number of cellars and basements were flooded. Heavy losses were sustained by merchants having goods stored in cellars.

Fallston, Harford county, Maryland: the rainfall on the 3d (5.96 inches) is the largest amount for one day that has been recorded since September, 1870. The Little Gunpowder River rose to a height seven feet higher than any previous flood mark. Bridges, dams, etc., along the course of the river were swept away.

Baltimore, Maryland: the very heavy rainfall on the 3d, with an unusually high tide, caused Jones Falls to overflow portions of neighboring streets. The rainfall amounted to 3.35 inches. Much damage was done to crops in the adjacent counties.

Hartford, Connecticut: during the night of the 3-4th occurred one of the heaviest rain storms ever experienced here. The rainfall, as collected by different gauges in this vicinity, ranged from about 3.50 to 5.50 inches. Several washouts occurred on the Connecticut Valley railroad, causing delay of trains. The Connecticut River rose more than four feet.

Whitehall, Washington county, New York: the very heavy rains on the 12th and 13th caused a large amount of damage to farm property in this county. A washout occurred near Fairhaven, and another about two miles north of Whitehall.

Bellows Falls, Windham county, Vermont: one of the heaviest rain storms of the season occurred here during the night of the 13-14th. The Connecticut River rose rapidly; a section of a boom protecting the Fall Mountain dam gave way.

White River Junction, Windsor county, Vermont: the heaviest rain storm that has occurred here since 1869 prevailed on the 13th and during the night of the 13–14th. The highways were badly washed and many bridges were swept away. The damage at this place is estimated at $2,000.

Concord, New Hampshire: the very heavy rainfall on the 13th and 14th caused the undermining of several buildings and the washing away of roads, bridges, etc., throughout the Pemigewassett Valley, and the crops in many localities were entirely ruined. The Pemigewassett River rose thirteen feet in ten hours, and the Contoocook River rose five feet in eight hours. Reports indicate that the area of excessive rainfall extended diagonally across the state from northwest to southeast. But little rain fell at Concord and in the northern part of the state.

Plymouth, New Hampshire, 14th: during the past week very heavy rains have fallen in this part of the state, causing a destructive freshet. In but two instances during the past twenty years, viz., in the autumn of 1869, and in December, 1881, has the Pemigewassett River reached a higher stage than during this freshet. A large amount of damage was done to crops, bridges, and other property.

Davenport, Iowa: the remarkably heavy rainfall on the 23d and 24th caused much damage in this city and vicinity, more than six inches of rain having fallen on those dates. Traffic on the various railroads running into this city was interrupted on account of washouts. All streams in the surrounding country were much swollen, and many bridges were washed away.

Cedar Rapids, Linn county, Iowa: on the 23d and 24th a very heavy rain storm prevailed, more than three and one-half inches of rain having fallen. Washouts occurred on the railroads in this vicinity, and numerous bridges were washed away.

Savannah, Georgia: very heavy rains fell on the 31st, from early morning until 2 p. m. During that time 4.34 inches of rain fell, which resulted in considerable damage to railroads, bridges, etc., in this vicinity.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for August, 1885, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 86.31 per cent. The percentages for the four elements are: Weather, 83.15; direction of the wind, 90.71; temperature, 85.01; barometer, 87.32 per cent. By geographical districts, they are: For New England, 82.49; middle Atlantic states, 84.91; south Atlantic states, 88.08; eastern Gulf states, 88.39; western Gulf states, 81.99; lower lake region, 84.01; upper lake region, 86.46; Ohio Valley and Tennessee, 86.07; upper Mississippi valley, 86.45; Missouri Valley, 84.97; north Pacific coast region, 91.37; middle Pacific coast region, 91.23; south Pacific coast region, 93.73. There were 3,374 predictions made, of which number, seventy-eight or 2.31 per cent., are considered to have entirely failed; one hundred and two, or 3.02 per cent., were one-fourth verified; three hundred and thirty, or 9.78 per cent., were one-half verified; five hundred and sixty-nine, or 16.87 per cent., were three-fourths verified; 2,295, or 68.02 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

The percentages of verifications of special predictions for certain localities are, as follows:

Chambersburg and York, Pennsylvania, 78.23; Richmond, Virginia, 80.65; Meadville, Pennsylvania, 74.60; Oil City, Pennsylvania, 77.82; Columbus, Ohio, 61.70; Bucyrus and northern Ohio, 71.77; Albany, New York, 76.21; Cincinnati, Ohio, 76.21; Buffalo, New York, 76.61; Indianapolis, Indiana, 74.60; Chicago, Illinois, 82.66; Saint Louis, Missouri, 76.21; Cairo, Illinois, 79.10; Boston, Massachusetts, and New Haven, Connecticut, 69.35; Louisville, Kentucky, 71.77; Detroit, Michigan, 80.65; Kansas, Indian Territory and western Missouri, 75.81; central Illinois and western Indiana, 78.63; northwestern Ohio and eastern Indiana, 75.40; Toledo, Ohio, 73.79; Milwaukee, Wisconsin, 81.85; Alabama, 82.67; Jacksonville, Florida, 80.24; Omaha, Nebraska (twenty-five days), 75.50; Arkansas (twenty-five days), 75.00; Georgia (twenty-five days), 84.50; Tennessee (twenty-five days), 76.00; Dallas, Texas, twenty-five days), 86.00; Rochester and Oswego, New York, 79.00; Portland, Maine, 63.71; New York City and Philadelphia, Pennsylvania, 77.82; Colorado, 80.66; District of Columbia and Baltimore, Maryland, 68.15; Memphis, Tennessee, beginning on the 20th, 61.46; Shreveport, Louisiana, beginning on the 20th, 86.46; Cumberland, Maryland, beginning on the 26th, 83.33; Hagerstown, Maryland, beginning on the 26th, 83.33; Wheeling, West Virginia, beginning on the 26th, 91.67; Lawrenceburg, Indiana, beginning on the 26th, 75.00; Blanchester, Ohio, beginning on the 27th, 60.00; Portsmouth, Ohio, one day (31st), 50.00.

CAUTIONARY SIGNALS.

During August, 1885, seventy-nine cautionary signals were ordered. Of these, fifty-four, or 68.35 per cent., were justified by winds of twenty-five miles or more per hour, at or within one hundred miles of the station. Forty-one cautionary off-shore signals were ordered, of which number, twenty-two, or 53.66 per cent., were fully justified both as to direction, and velocity; thirty-two, or 78.05 per cent.; were justified as to direction, and twenty-five, or 60.98 per cent., were justified as to velocity. One hundred and twenty signals of all kinds were ordered. seventy-six, or 63.33 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Of the above cautionary off-shore signals, twenty-six were changed from cautionary signals. Four signals were ordered late. In sixty-four cases winds of twenty-five miles or more per hour were reported for which no signals were ordered.

Table of miscellaneous meteorological data for August, 1885—Signal Service observations.

Stations.	Elevation above sea-level.	Atmospheric pressure (in inches and hundredths).							Temperature of the air (in degrees Fahrenheit).												Mean rel. humidity.	Mean dew-point.	Precipitation.	Departure from normal	Winds.				No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes.				Monthly mean.	Departure from normal.	Extremes.						Daily ranges.								Total movement.	Prevailing direction.	Max. velocity.					
					Highest barometer	Date.	Lowest barometer	Date.			Max.	Date.	Mean max	Min.	Date.	Mean min	Monthly range.	Greatest.	Date.	Least.	Date.						Miles p.h.	Direction.	Date.				
New England.																															
Eastport	61	29.87	—.04	29.94	30.24	9	29.59	14	0.65	60.1	—0.7	75.2	17	67.8	45.5	28	53.4	29.7	21.2	17	8.0	31	79.9	53.3	4.26	+1.00	4,277	s.	35	s.	4	9	4	13	14
Portland	99	29.85	—.03	29.95	30.24	17	29.58	14	0.67	64.1	—3.9	84.6	14	71.5	47.5	27	57.0	37.1	21.1	22	6.8	10	80.0	57.4	5.91	+2.53	5,025	s.	25	se.	4	13	7	10	8
Mount Washington	6,279	21.85	.....	29.93	30.18	16	29.04	26	0.53	43.6	—3.7	61.8	9	49.5	23.4	27	38.1	38.4	19.4	9	3.4	11	87.2	39.6	14.26	+6.63	18,760	nw.	92	s.	4	20	1	22	8
Boston	125	29.83	—.07	29.95	30.26	17	29.60	14	0.66	67.4	—2.1	88.8	14	75.1	47.2	28	60.6	41.6	21.5	24	5.7	30	75.6	58.8	7.64	+3.27	7,431	sw.	33	s.	4	12	7	21	3
Block Island	27	29.95	—.05	29.97	30.26	17	29.69	14	0.57	68.7	+0.3	81.9	12	73.8	52.9	27	63.3	29.0	18.5	17	5.4	3	82.8	63.1	3.15	—0.33	8,330	sw.	32	n.	19	10	6	17	8
Narragansett Pier	.....	.....	.....	.....	.....	.....	.....	.....	.....	67.2	.....	84.0	22	75.1	46.5	28	59.3	37.5	.....	.....	.....	.....	.....	.....	6.90	+4.55	.....	.....	.....	.....	.....	10	.....	.....	.....
Point Judith	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Haven	107	29.87	.....	29.97	30.27	17	29.65	24	0.62	67.8	—2.6	86.5	24	76.8	45.1	28	60.4	41.4	25.2	28	6.9	23	78.1	60.0	8.13	+2.51	4,675	s.	32	e.	3	14	7	13	11
New London	47	29.95	—.03	29.99	30.27	17	29.69	14	0.58	68.4	—1.5	85.0	22	75.4	48.8	28	61.9	36.2	20.3	16	5.7	3	84.0	63.1	7.69	+2.50	4,518	sw.	27	e.	3	12	7	15	9
Middle Atlantic states.																																			
Albany	83	29.90	—.05	29.98	30.27	17	29.64	13	0.63	67.2	—3.7	87.7	12	77.0	46.0	28	59.7	41.7	25.5	17	7.6	3	71.2	56.8	7.58	+4.23	4,826	sw.	36	s.	3	19	9	17	5
New York City	164	29.82	—.06	29.98	30.27	17	29.69	13	0.59	70.8	—1.4	89.6	24	78.8	51.0	27	64.2	38.6	22.6	24	7.2	23	76.3	62.3	7.70	+2.80	5,108	nw.	32	s.	5	9	7	14	10
Philadelphia	117	29.87	—.07	29.98	30.26	17	29.63	3	0.63	71.8	—2.0	90.8	1	81.6	51.1	27	64.9	39.7	27.6	25	8.2	7	73.6	62.0	6.80	+1.81	6,431	sw.	28	sw.	3	13	5	18	11
Atlantic City	13	29.96	—.07	29.96	30.25	17	29.66	3	0.58	73.1	+1.1	89.3	14	80.3	48.8	27	66.4	40.5	21.7	26	5.0	3	83.2	67.4	4.50	—0.62	5,937	s.	32	ne.	25	13	4	18	9
Barnegat City	22	29.96	—.06	29.97	30.26	17	29.69	3	0.57	72.7	+1.1	89.2	24	79.5	52.2	27	66.3	37.0	25.3	25	7.1	15	82.5	66.7	6.14	+1.27	9,310	s.	38	ne.	25	15	7	13	11
Cape May	27	29.94	.....	29.95	30.22	17	29.62	25	0.60	73.8	+0.7	88.1	24	79.8	53.5	28	67.3	34.6	23.2	25	6.5	12	79.4	66.7	3.47	—2.26	9,450	s.	40	sw.	3	7	6	13	12
Little Egg Harbor	.....	.....	.....	.....	.....	.....	.....	.....	.....	73.6	.....	87.5	5	80.3	49.6	27	66.8	37.9	.....	.....	.....	.....	.....	.....	3.69	—2.62	.....	.....	.....	.....	...	11	.....	.....	.....
Sandy Hook	28	29.96	—.00	29.98	30.27	17	29.69	24	0.58	71.8	—1.0	90.4	24	79.7	54.9	27	66.5	35.5	20.3	24	3.2	3	78.0	64.1	5.48	+0.77	10,616	se.	50	se.	3	15	6	13	12
Cape Henlopen	.....	.....	.....	.....	.....	.....	.....	.....	.....	74.6	.....	98.1	21	81.7	53.5	28	67.6	44.6	.....	.....	.....	.....	.....	.....	3.49	.....	.....	.....	.....	.....	...	9	.....	.....	.....
Baltimore	45	29.94	—.07	29.97	30.24	17	29.61	3	0.63	74.6	—0.7	93.5	24	83.1	53.4	28	67.4	40.1	26.6	25	7.4	7	69.6	63.2	7.78	+3.52	4,073	se.	18	ne.	25	14	8	16	7
Ocean City	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....
Washington City	106	29.88	—.06	29.98	30.25	17	29.60	3	0.65	73.4	—1.3	94.2	25	82.7	50.8	28	65.1	43.4	30.7	25	7.3	7	73.7	63.7	6.49	+1.81	3,466	s.	22	w.	3	12	6	16	9
Cape Henry	16	29.98	—.05	29.98	30.24	27	29.66	3	0.58	77.1	+0.9	95.2	23	84.8	58.9	28	71.4	36.3	22.2	23	4.0	30	76.0	68.4	2.87	—2.26	8,780	s.	45	n.	26	7	3	16	12
Chincoteague	8	29.97	—.06	29.96	30.22	17	29.65	3	0.57	75.0	+1.9	91.2	24	82.1	56.2	27	68.9	35.0	20.5	25	7.4	30	79.0	67.5	1.94	—2.41	5,348	sw.	40	ne.	26	10	5	11	15
Lynchburg	652	29.32	—.05	29.97	30.22	17	29.61	3	0.60	74.8	—0.9	94.3	23	84.7	51.4	27	66.3	42.9	26.5	21	7.9	30	72.9	64.6	1.56	—2.59	2,021	s.	16	nw.	26	9	3	21	7
Norfolk	30	29.98	—.04	29.99	30.22	28	29.70	3	0.52	77.9	+0.9	94.3	24	85.4	60.2	28	71.3	34.1	20.5	19	6.1	30	72.9	67.8	2.39	—3.49	5,250	sw.	20	n.	26	10	4	17	10
South Atlantic states.																																			
Cape Lookout	.....	.....	.....	.....	.....	...	.....	...	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	...	...	...	...	...	...
Charlotte	808	29.16	—.04	29.96	30.18	27	29.69	25	0.49	76.0	+0.7	93.5	24	85.1	55.8	27	68.7	37.7	21.7	5	8.3	30	69.7	65.4	4.01	—0.66	2,704	sw.	21	sw.	2	10	9	13	9
Fort Macon	11	29.99	—.04	29.97	30.18	27	29.44	25	0.74	78.8	+1.1	88.5	25	83.9	63.6	27	74.2	24.9	15.8	26	3.1	31	90.2	75.4	7.73	+1.56	10,126	sw.	92	sw.	25	16	3	17	11
Hatteras	12	29.99	—.04	29.98	30.18	27	29.51	25	0.67	78.0	+0.6	87.0	25	83.0	64.4	27	73.6	22.6	12.6	1	5.4	31	80.9	71.4	5.97	—0.27	7,143	s.	52	s.	26	16	5	11	15
Kitty Hawk	9	30.00	—.05	29.99	30.22	27	29.63	25	0.59	77.8	+1.1	94.7	24	84.6	62.7	28	73.0	32.0	20.3	25	3.8	9	81.8	71.3	3.43	—4.47	9,537	sw.	50	n.	26	11	4	12	15
New River Inlet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....
Portsmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....
Scott's Hill	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....
Smithville	34	29.96	—.05	29.97	30.16	21	29.52	25	0.64	79.5	+0.2	91.0	24	86.1	62.2	27	72.2	28.8	21.7	6	5.6	16	83.2	73.7	5.92	+0.41	7,780	s.	98	sw.	25	14	9	11	11
Wash Woods	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....
Wilmington	52	29.94	.....	29.97	30.16	27	29.46	25	0.70	79.7	+1.2	93.5	20	87.6	60.0	27	72.5	33.5	21.0	5	10.0	16	77.6	71.6	5.87	—2.18	4,127	sw.	52	sw.	25	15	6	19	6
Charleston	52	29.95	—.03	29.97	30.16	22	29.73	25	1.44	80.6	—0.1	93.2	6	87.4	67.5	31	75.0	25	7.9	14	7.8	24	81.2	73.9	19.18	+11.82	4,328	sw.	*	se.	25	18	11	12	8
Augusta	183	29.82	—.05	29.97	30.15	27	29.72	25	0.43	79.2	—0.4	99.1	23	92.4	63.7	27	70.9	35.4	30.0	5	10.9	17	74.6	69.0	3.38	—1.46	2,314	se.	19	s.	1	10	5	16	7
Savannah	87	29.91	—.04	29.97	30.16	22	29.62	25	0.53	81.1	+0.6	94.0	5	87.8	69.0	27	74.8	25.0	18.5	25	6.2	31	77.3	72.7	14.38	+6.71	4,660	s.	56	nw.	25	15	8	12	11
Jacksonville	43	29.96	—.03	29.97	30.15	22	29.62	24	0.52	80.7	—0.2	94.1	2	89.5	70.2	22	75.0	23.9	20.4	22	5.0	29	79.2	73.2	7.56	+0.52	5,057	sw.	40	w.	24	18	6	17	8
Florida peninsula.																																			
Cedar Keys	22	29.96	—.04	29.94	30.10	22	29.79	24	0.30	82.0	+0.3	91.0	6	87.5	70.2	14	75.9	20.8	17.5	11	6.2	3	82.5	76.0	10.09	+0.62	6,044	w.	36	s.	31	18	14	15	2
Key West	20	30.01	+.02	29.98	30.09	21	29.89	26	0.20	85.1	+0.9	94.0	12	91.3	75.1	25	79.7	18.9	13.9	14	9.1	8	76.1	76.5	2.55	—2.70	4,823	se.	24	s.	26	12	3	25	3
Sanford	25?	30.00	.....	29.99	30.12	21	29.79	24	0.33	79.7	—0.7	94.9	25	91.6	70.0	14	73.4	24.9	23.6	21	8.0	24	83.1	73.5	6.75	—2.17	3,643	sw.	27	ne.	23	19	4	17	10
Eastern Gulf states.																																			
Atlanta	1,129	28.86	—.05	29.99	30.17	22	29.80	25	0.37	76.5	+1.1	90.0	24	84.6	59.0	27	69.7	31.0	18.5	16	8.0	17	75.0	67.0	6.92	+3.07	5,139	nw.	25	n.	27	11	5	13	13
Pensacola	30	29.96	—.03	29.95	30.14	25	29.73	30	0.41	80.8	+0.5	92.6	25	88.6	72.4	27	75.3	20.2	16.8	10	6.7	10	82.8	74.7	11.74	+1.26	4,338	s.	27	sw.	2	17	6	22	3
Mobile	35	29.96	—.02	29.96	30.16	22	29.80	30	0.36	79.0	—1.7	94.2	8	88.4	69.0	27	72.9	25.2	21.4	23	5.1	30	85.3	73.6	6.67	—1.01	4,552	n.	44	se.	10	20	4	17	10
Montgomery	219	29.78	—.02	29.97	30.18	22	29.77	2	0.41	79.7	—0.4	95.4	7	89.3	64.9	28	71.7	30.5	24.0	6	6.9	30	80.3	72.4	3.93	+0.17	2,863	ne.	24	ne.	2	13	7	17	7
Vicksburg	209	29.78	—.04	29.97	30.15	22	29.80	2	0.34	79.6	—0.8	97.2	10	90.3	61.8	16	71.6	35.4	25.1	1	7.8	12	76.8	70.8	1.04	—2.39	2,664	ne.	32	w.	2	5	1	19	11
New Orleans	52	29.94	—.01	29.96	30.13	22	29.79	30	0.34	80.4	—1.6	93.2	7	89.2	69.6	18	74.7	23.6	22.5	18	8.3	15	83.9	74.5	4.25	—1.37	3,914	sw.	26	se.	19	18	3	22	6
Western Gulf states.																																			
Shreveport	227	29.76	—.02	29.96	30.08	19	29.80	24	0.28	81.8	—0.2	100.7	1	93.2	61.8	27	72.3	38.9	28.1	27	10.0	26	70.7	70.0	0.92	—1.09	.....	.....	...	.....	...	5	2	15	14
Fort Smith	470	29.49	—.05	29.94	30.11	18	29.72	24	0.40	77.2	+0.5	97.5	11	88.9	57	1	31	68.3	40.4	29.4	19	7.4	26	78.5	69.0	2.99	+0.86	2,582	e.	26	n.	5	6	7	13	11
Little Rock	299	29.66	—.04	29.93	30.09	18	29.67	2	0.42	79.9	+1.9	98.7	11	91.0	64.3	27	72.5	34.4	22.5	9	11.6	5	78.6	72.2	1.93	—1.50	3,970	s.	22	ne.	11	7	4	13	14
Galveston	40	29.97	+.01	29.97	30.11	22	29.85	1	0.26	84.2	+0.6	92.5	30	88.8	72.3	17	79.3	20.2	12.5	30	6.6	19	74.9	75.1	1.74	—3.61	6,255	s.	24	ne.	30	7	3	12	16
Indianola	26	29.94	—.02	29.94	30.07	19	29.82	1	0.25	82.8	+0.1	95.0	1	90.5	72.5	14	77.0	22.5	17.4	1	8.6	18	79.4	75.3	0.67	—3.46	7,422	s.	32	n.	14	7	1	16	14
Palestine	533	29.45	.....	29.96	30.11	18	29.79	24	0.32	80.4	—1.1	97.5	10	91.6	64.2	31	73.2	33.3	24.1	31	10.6	14	78.6	72.2	1.87	—0.22	5,129	s.	29	s.	22	8	0	19	12
San Antonio	781	29.16	.....	29.90	30.02	19	29.79	1	0.23	81.5	—0.7	97.8	7	94.2	66.3	18	72.2	31.5	25.7	17	15.5	30	67.6	67.8	0.95	—2.72	3,565	se.	18	se.	6	4	1	13	17
Rio Grande valley.																																			
Brownsville	59	29.91	.00	29.92	30.02	18	29.83	15	0.18	81.0	—2.1	95.1	7	91.6	71.0	17	75.5	24.1	20.6	15	12.4	25	82.1	74.1	2.06	—2.81	4,556	s.	24	s.	6	10	3	14	14
Rio Grande City	230	29.75	.00	29.90	30.03	19	29.79	25	0.24	85.2	+2.0	108.6	6	99.3	71.6	17	76.3	37.0	31.4	6	14.6	26	64.9	69.9	0.57	—3.47	5,896	se.	21	se.	6	6	1	13	17
Ohio valley & Tennessee.																																			
Chattanooga	783	29.19	—.06	29.97	30.14	18	29.75	2	0.39	76.1	+0.7	93.1	9	85.6	60.7	27	69.7	32.4	25.9	5	6.9	17	81.1	69.2	4.66	—0.20	3,141	sw.	22	e.	8	13	7	16	8
Knoxville	980	29.00	—.06	29.98	30.15	18	29.70	2	0.46	74.8	+0.1	92.8	9	85.1	56.2	27	67.2	36.6	25.6	5	8.9	17	77.1	66.3	4.05	—0.21	3,231	sw.	24	ne.	17	13	7	14	10
Memphis	321	29.66	—.04	29.96	30.13	18	29.68	2	0.44	79.5	+0.4	98.5	10	88.5	59.5	27	71.5	39.0	22.0	10	9.4	13	70.2	68.2	1.70	—1.45	4,204	nw.	21	nw.	2	1	2	15	14
Nashville	549	29.41	—.04	29.95	30.11	18	29.69	2	0.42	77.3	—0.9	96.1	9	87.4	56.5	27	69.6	39.6	23.9	27	10.5	3	70.5	66.2	1.62	—2.40	3,811	w.	37	nw.	10	5	6	20	5
Louisville	551	29.40	—.03	29.97	30.20	27	29.62	2	0.58	75.6	—0.7	96.7	9	85.9	52.4	26	67.1	44.3	20.8	16	10.6	13	70.7	64.6	2.57	—0.59	5,218	n.	28	nw.	24	10	4	14	13
Greencastle	897	29.04	.....	29.94	30.20	27	29.54	2	0.66	69.3	.....	89.5	9	78.1	47.3	26	61.8	42.2	26.4	20	7.0	22	76.7	61.0	7.24	.....	3,730	sw.	18	nw.	9	10	4	16	11
Indianapolis	766	29.18	—.06	29.95	30.21	27	29.54	2	0.67	70.0	—4.2	95.1	9	81.3	47.7	28	60.4	47.4	32.7	20	8.8	25	73.8	60.2	5.82	+2.72	3,704	sw.	26	nw.	9	12	7	14	10
Cincinnati	628	29.32	—.04	29.95	30.22	27	29.55	3	0.66	72.3	—3.5	94.0	1	82.1	50.9	28	63.8	43.1	20.9	18	11.0	3	71.2	61.5	4.95	+0.93	4,621	se.	31	nw.	22	12	3	14	14
Columbus	805	29.13	—.07	29.95	30.24	27	29.51	3	0.73	70.0	—2.5	90.8	9	79.7	50.0	27	62.5	40.8	23.1	16	7.9	13	79.4	62.9	5.50	+2.32	4,276	ne.	28	nw.	3	12	3	18	10
Pittsburg	760	29.10	—.08	29.95	30.23	27	29.53	3	0.71	71.0	—0.9	94.6	1	81.7	47.4	27	62.1	47.2	30.8	21	8.9	...	71.3	60.1	5.64	+2.48	3,705	nw.	23	s.	3	14	8	18	15
Lower lake region.																																			
Buffalo	690	29.23	—.06	29.94	30.24	27	29.45	3	0.78	64.7	—4.6	82.7	12	71.7	49.1	27	58.2	33.6	23.8	16	6.0	13	84.4	59.6	10.63	+7.72	6,242	sw.	43	sw.	4	17	11	16	4
Oswego	335	29.60	—.07	29.95	30.20	16	29.52	3	0.68	63.2	—6.5	83.5	12	69.5	46.9	28	56.7	36.3	23.6	17	6.8	24	77.1	55.5	2.37	—0.18	6,258	w.	36	se.	3	11	13	12	6
Rochester	621	29.31	—.05	29.95	30.22	27	29.48	3	0.74	63.8	—5.5	87.1	12	73.9	44.4	27	56.6	42.7	25.2	10	10.2	3	82.5	58.0	2.20	—0.81	5,893	sw.	37	se.	3	17	15	12	4
Erie	681	29.24	—.07	29.94	30.23	27	29.42	3	0.81	65.4	—5.1	86.2	21	74.1	48.0	28	58.7	38.2	26.2	21	9.4	13	77.1	57.7	7.97	+4.65	6,361	ne.	31	w.	3	18	14	14	3
Cleveland	690	29.25	—.07	29.96	30.25	26	29.48	3	0.77	65.8	—4.5	86.5	21	74.6	45.6	28	59.5	40.9	25.3	21	4.3	10	84.0	60.5	5.14	+1.85	6,067	ne.	27	sw.	3	19	12	11	8
Sandusky	639	29.30	—.06	29.95	30.26	27	29.46	3	0.80	67.5	—4.5	91.5	9	75.8	48.9	28	60.6	42.6	25.9	20	6.4	26	74.1	58.4	3.87	—0.17	8,387	n.	63	nw.	9	16	8	17	6
Toledo	651	29.29	—.05	29.96	30.27	27	29.46	3	0.81	66.9	—4.8	89.2	9	74.7	48.1	28	59.3	41.1	22.9	17	7.1	7	81.6	60.8	3.60	+0.70	5,666	e.	30	e.	2	13	6	17	8
Detroit	661	29.27	—.06	29.95	30.26	27	29.41	3	0.85	66.7	—3.5	86.0	9	74.2	48.4	27	59.3	27.6	22.4	12	7.3	23	78.1	59.3	5.05	+2.22	5,951	s.	28	sw.	21	14	8	13	10
Upper lake region.																																			
Alpena	609	29.31	—.05	29.95	30.28	26	29.40	3	0.88	59.1	—5.3	81.0	13	68.2	42.1	25	51.7	38.9	26.4	13	4.0	29	83.2	53.5	7.18	+3.73	6,599	w.	25	w.	21	14	9	14	8
Escanaba	608	29.28	—.07	29.92	30.29	26	29.45	3	0.84	59.6	—5.4	83.5	18	67.1	38.6	25	52.1	44.9	28.1	18	5.4	8	76.9	51.7	5.25	+1.14	6,791	n.	27	n.	13	19	12	16	3
Grand Haven	620	29.31	—.06	29.95	30.27	27	29.54	3	0.73	60.8	—7.5	85.6	1	68.1	44.2	27	54.6	41.4	22.5	20	5.8	31	80.9	54.5	4.82	+1.95	6,122	nw.	33	nw.	3	16	8	15	8
Mackinaw City	605	29.31	—.05	29.95	30.28	27	29.46	3	0.83	59.3	—1.8	75.8	1	66.5	43.5	25	52.9	32.3	25.0	16	6.7	29	80.0	52.7	2.78	+0.16	6,259	nw.	25	se.	21	12	11	14	6
Marquette	672	29.22	—.07	29.94	30.33	26	29.49	3	0.84	58.0	—7.0	83.1	12	65.7	42.1	24	50.7	41.0	42.0	23	3.2	29	77.6	50.5	2.47	—0.67	6,024	nw.	25	s.	16	10	10	17	4
Port Huron	633	29.29	—.05	29.95	30.27	11	29.39	3	0.88	63.0	—4.8	82.4	18	71.4	45.0	15	55.4	37.4	26.8	12	8.5	23	79.9	56.4	3.28	+0.50	5,699	ne.	27	sw.	21	17	6	20	5
Chicago	661	29.27	—.05	29.95	30.28	26	29.58	2	0.7	68.1	—3.6	85.0	12	74.3	55.1	15	62.4	29.9

Table of miscellaneous meteorological data for August, 1885—Signal Service observations—Continued.

Stations.	Elevation above sea-level.	Atmospheric pressure (in inches and hundredths).							Temperature of the air (in degrees Fahrenheit).														Mean rel. humidity.	Mean dew-point.	Precipitation.	Departure from normal	Winds.				No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes.				Monthly mean.	Departure from normal.	Extremes.			Daily ranges.													Total movement.	Prevailing direction.	Max. velocity.					
					Highest barometer	Date.	Lowest barometer	Date.	Monthly range of barometer.		Max.	Date.	Mean max	Min.	Date.	Mean min	Monthly range.	Greatest.	Date.	Least.	Date.							Miles p.hr	Direction.	Date.				
Extreme northwest.																																
Moorhead	923	28.98	+.01	29.95	30.31	26	29.51	7	0.80	60.2	— 6.0	91.5	7	73.8	32.3	25	49.1	59.2	43.3	19	3.6	27	75.4	51.2	1.47	—2.96	6,601	n.	40	se.	11	8	3	18	10
Saint Vincent	804	29.11	+.01	29.97	30.36	26	29.62	7	0.75	58.3	— 5.1	86.2	15	71.4	27.4	24	47.1	58.8	41.0	14	13.9	27	83.8	53.0	0.95	—2.73	4,931	nw.	28	nw.	3	11	6	18	7
Bismarck	1,694	28.20	+.03	29.96	30.29	25	29.62	7	0.67	62.3	— 5.5	92.3	17	74.7	39.0	25	52.3	53.3	35.6	9	6.1	20	68.6	50.3	1.62	—1.20	4,465	n.	30	nw.	9	8	7	13	11
Fort Buford	1,930	27.98	+.04	29.97	30.26	25	29.63	7	0.64	61.9	— 4.7	90.5	16	76.1	39.6	25	51.3	50.9	37.5	9	7.6	26	69.7	50.6	1.50	+0.36	5,263	nw.	32	e.	7	9	8	15	8
Fort Totten†	1,900	28.38	.....	29.94	30.28	25	29.60	7	0.69	60.0	.....	86.5	15	71.8	35.5	25	49.6	51.0	35.2	14	7.8	27	74.4	50.8	1.91	.....	6,447	nw.	37	se.	11	8	3	15	10
Upper Mississippi valley.																																
Saint Paul	831	29.09	—.01	29.95	30.34	26	29.60	20	0.74	65.0	— 4.7	84.2	7	75.3	46.1	25	57.7	38.1	26.1	9	7.8	28	78.2	57.5	3.69	—0.07	3,683	nw.	28	w.	3	9	7	12	12
La Crosse	725	29.19	—.04	29.93	30.31	26	29.59	3	0.72	68.8	— 5.4	83.5	3	73.4	43.8	26	58.9	39.7	23.0	15	6.3	29	76.0	57.6	3.65	0.00	4,807	s.	24	nw.	13	11	7	13	11
Davenport	615	29.33	—.04	29.95	30.29	26	29.63	23	0.66	68.0	— 5.3	89.8	8	77.7	47.7	26	59.7	42.1	24.5	17	7.1	29	72.9	58.0	12.68	+9.08	5,233	nw.	26	n.	23	11	6	17	8
Des Moines	849	29.09	—.04	29.95	30.28	26	29.67	20	0.62	68.8	— 4.2	90.5	1	79.7	46.0	26	60.4	44.5	30.0	20	6.0	24	77.2	50.6	5.10	+1.39	3,374	n.	16	n	13	12	9	11	11
Dubuque	665	29.27	.....	29.94	30.30	26	29.63	3	0.67	66.4	— 5.7	86.4	18	76.3	46.1	26	57.9	40.3	26.6	3	8.5	2	75.2	57.5	8.62	+4.52	3,030	nw.	14	n.	24	12	9	9	13
Keokuk	618	29.33	—.03	29.95	30.27	26	29.70	6	0.56	70.0	— 5.3	97.9	1	81.4	49.1	26	61.4	48.8	30.4	18	12.1	25	74.4	60.7	5.98	+3.10	5,180	s.	20	s.	6	8	4	17	10
Cairo	359	29.62	—.04	29.97	30.16	26	29.67	2	0.49	76.5	— 1.3	94.8	9	84.6	54.5	26	69.4	40.3	20.8	29	8.4	15	73.3	66.8	2.40	—0.38	4,884	s.	26	n.	24	6	2	17	12
Springfield	644	29.32	—.06	29.94	30.23	26	29.62	2	0.62	71.0	— 3.0	92.1	8	79.9	48.0	26	62.6	44.1	25.7	20	6.7	6	69.4	59.9	4.82	+2.28	4,557	s.	23	n.	25	10	7	15	9
Saint Louis	571	29.38	—.05	29.95	30.22	26	29.67	2	0.56	74.6	— 2.2	95.0	8	83.7	53.5	26	68.1	41.5	21.2	20	10.9	9	75.7	65.8	2.96	+0.49	6,010	ne.	29	sw.	24	12	4	15	12
Missouri valley.																																
Lamar	1,028	28.93	.....	29.96	30.16	26	29.75	26	0.41	73.4	.....	94	0	11	84.6	52.1	26	65.0	41.9	26.5	17	10.0	2	77.0	64.9	70.4	.....	6,183	s.	30	w.	24	3	5	15	13
Leavenworth	842	29.10	—.04	29.95	30.23	26	29.67	6	0.56	73.5	— 2.7	97.5	8	84.3	52.0	30	63.9	45.5	27.0	20	12.0	21	74.0	64.2	5.20	+1.90	4,312	n.	22	s.	23	11	4	13	14
Omaha	1,113	28.85	—.01	29.97	30.27	26	29.67	7	0.60	69.9	— 4.5	90.8	1	79.1	50.4	26	61.8	40.4	26.9	20	9.1	24	78.3	62.3	4.53	+1.00	5,217	n.	27	se.	5	15	6	11	14
Fort Bennett	1,510	28.42	.....	29.90	30.25	25	29.59	7	0.66	60.0	— 5.8	96.7	17	78.3	45.4	21	56.7	51.3	39.3	17	8.6	26	70.7	54.9	5.87	+4.57	5,446	n.	35	se.	5	11	9	11	11
Fort Sully	.....	.....	.....	.....	.....	.....	.....	.....	.....	68.9	.....	102.7	17	80.8	45.4	21	56.9	57.3	.....	.....	.....	.....	.....	.....	4.50	+2.79	.....	.....	.....	.....	.....	10	.....	.....	.....
Huron	1,305	28.62	+.02	29.96	30.26	26	29.59	7	0.68	64.0	— 4.6	89.2	7	75.5	47.3	25	55.4	41.9	36.3	19	6.8	26	78.7	56.5	3.89	+1.21	4,980	nw.	25	nw.	20	15	8	13	10
Yankton	1,228	28.70	.00	29.96	30.25	26	29.64	7	0.62	65.7	— 6.5	88.6	17	76.0	46.2	28	57.9	42.4	28.3	19	5.4	24	79.5	58.5	6.21	+3.62	4,877	nw.	38	ne.	1	13	10	8	13
Northern slope.																																
Fort Assiniboine	2,720	27.20	.....	29.97	30.23	31	29.68	6	0.55	63.6	— 2.1	96.4	14	78.1	41.3	8	50.7	55.1	42.0	9	10.0	10	61.8	48.6	1.45	—0.54	6,333	w.	39	n.	19	8	5	10	16
Fort Benton	2,681	27.26	.....	30.06	30.31	31	29.76	6	0.56	64.7	— 3.7	104.9	14	81.6	40.0	8	51.3	64.0	47.9	14	10.8	25	55.8	45.7	1.81	+0.77	4,415	sw.	29	ne.	19	7	6	10	15
Fort Custer	3,040	26.92	.....	29.98	30.24	31	29.62	6	0.62	65.3	— 3.0	99.4	14	83.9	42.8	21	52.2	56.6	48.3	14	10.6	24	58.3	47.4	1.60	+0.44	4,126	ne.	43	nw.	27	7	3	10	18
Fort Maginnis	4,340	25.64	.....	29.95	30.18	31	29.66	6	0.52	60.9	— 2.6	95.6	14	73.9	41.4	29	49.6	54.2	39.3	14	8.9	24	62.3	47.2	0.94	+0.17	6,385	n.	63	ne.	26	9	5	15	11
Helena	4,044	25.88	.00	29.92	30.12	31	29.64	6	0.48	64.1	— 3.1	92.7	14	77.3	38.3	26	50.5	54.4	36.8	16	11.9	25	66.2	51.7	0.48	—0.46	3,411	sw.	22	sw.	9	6	3	9	19
Poplar River‡	2,030	27.91	.....	30.00	30.27	31	29.74	19	0.53	60.4	.....	91.2	10	74.3	36.1	25	47.7	55.1	43.2	13	9.3	26	70.1	51.7	0.42	—0.41	3,803	se.	29	n.	20	6	5	10	10
Deadwood	4,600	25.47	+.03	29.91	30.14	31	29.59	7	0.55	60.2	— 5.3	84.6	19	71.2	38.7	25	50.7	45.9	32.3	15	9.0	7	71.3	49.3	2.92	+0.96	3,217	ne.	20	sw.	19	13	3	10	18
Cheyenne	6,105	24.12	—.01	29.84	30.02	18	29.61	7	0.41	62.2	— 2.9	86.6	15	76.7	40.5	29	50.6	46.1	38.7	15	8.4	25	61.9	46.6	2.14	+0.67	6,063	nw.	39	w.	6	17	7	12	12
North Platte	2,841	27.12	+.01	29.90	30.13	31	29.58	7	0.55	67.2	— 4.8	89.1	7	78.3	51.2	26	59.2	37.9	29.0	15	6.2	24	78.0	59.2	4.87	+2.58	5,506	se.	26	se.	30	19	6	16	9
Middle slope.																																
Denver	5,294	24.85	+.01	29.86	30.03	18	29.63	7	0.39	68.0	— 2.3	92.8	3	82	0	46.4	31	55.7	46.4	36.3	3	11.9	25	56.9	49.5	1.18	—0.38	4,519	n.	36	nw.	20	16	5	14	12
Pike's Peak	14,134	18.11	.....	29.89	30.04	18	29.72	23	0.32	37.1	— 1.5	52.2	4	43.9	26.0	27	32.7	20.2	16.4	11	6.0	24	81.7	31.6	2.04	—2.12	11,441	w.	54	nw.	6	22	2	17	12
West Las Animas	3,899	26.09	—.01	29.81	29.99	13	29.55	7	0.44	72.5	+ 0.4	100.2	3	89.2	54.3	31	60.1	45.9	39.4	17	9.4	25	71.0	61.6	3.75	+2.18	5,109	e.	33	n.	24	11	4	18	9
Concordia	1,384	28.52	.....	29.91	30.16	26	29.58	23	0.58	71.1	.....	97.0	20	84.0	46.2	30	60.1	50.8	38.0	20	13.2	29	77.1	62.6	1.43	.....	5,089	ne.	23	sw.	23	8	2	20	9
Dodge City	2,517	27.42	—.03	29.76	30.05	13	29.36	23	0.49	73.1	— 1.9	95.5	7	85.2	52.4	30	64.5	43.1	32.1	22	7.5	26	69.5	61.4	1.80	—1.65	7,873	se.	38	s.	3	7	4	13	14
Fort Reno	.....	.....	.....	.....	.....	.....	.....	.....	.....	77.7	.....	98.4	21	90.3	55.0	30	65.1	43.4	.....	.....	.....	.....	.....	.....	3.74	+0.23	.....	.....	.....	.....	.....	8	.....	.....	.....
Fort Supply	.....	.....	.....	.....	.....	.....	.....	.....	.....	78.3	.....	97.5	6	88.2	54.0	29	68.5	43.5	.....	.....	.....	.....	.....	.....	0.52	—1.87	.....	.....	.....	.....	.....	10	.....	.....	.....
Southern slope.																																
Fort Sill	1,200	28.72	—.05	29.87	30.04	18	29.67	24	0.36	78.5	— 1.1	103.5	4	92.5	56.0	30	65.8	47.5	35.0	4	9.5	26	67.3	64.2	5.72	+3.41	6,101	s.	32	nw.	25	6	3	9	19
Fort Concho	1,900	28.08	—.04	29.90	30.07	19	29.70	24	0.37	81.7	+ 2.1	105.0	8	97.1	62.2	19	69.7	42.8	33.9	8	19.6	30	63.8	66.4	1.91	—1.84	6,455	s.	32	n.	2	7	3	20	8
Fort Davis	4,928	25.23	.....	29.84	29.95	18	29.71	6	0.24	73.0	+ 1.5	97.0	6	88.3	55.8	18	63.4	41.2	32.2	18	12.5	28	57.6	54.0	3.34	—2.21	3,961	ne.	42	e.	16	14	5	14	12
Fort Stockton	3,010	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Southern plateau.																																
El Paso	3,764	26.27	.00	29.84	30.00	19	29.63	6	0.36	79.7	+ 0.9	110.1	6	97.0	61.3	18	69.1	48.8	38.3	5	15.2	22	45.0	54.1	0.46	—2.08	3,396	e.	29	ne.	29	7	5	12	14
Lava§	.....	.....	.....	.....	.....	.....	.....	.....	.....	79.7	.....	105.8	19	96.6	57.0	26	62.8	48.8	.....	.....	.....	.....	.....	.....	1.78	.....	.....	.....	.....	.....	.....	12	.....	.....	.....
Santa Fé	7,026	23.41	+.07	29.82	29.96	14	29.66	6	0.30	66.3	+ 0.4	88.0	3	78.7	49.0	27	56.4	39.0	29.0	1	12.5	22	53.8	47.5	0.98	—2.03	4,816	se.	29	se.	2	8	4	26	1
Fort Apache	5,050	25.10	+.03	29.80	29.89	14	29.71	20	0.18	79.5	+ 0.8	98.1	2	87.6	50.0	27	57.0	48.1	38.0	2	14.4	24	64.1	56.0	3.16	—1.84	4,219	e.	38	nw.	3	10	5	15	11
Fort Bowie	.....	.....	.....	.....	.....	.....	.....	.....	.....	78.2	.....	99.0	5	90.8	52.0	31	65.0	47.0	.....	.....	.....	.....	.....	.....	2.19	.....	.....	.....	.....	.....	.....	10	.....	.....	.....
Fort Grant	4,856	25.26	.....	29.80	29.88	13	29.74	20	0.13	75.4	+ 0.8	96.4	4	87.0	60.0	22	66.3	36.4	30.0	4	11.6	21	43.1	52.8	1.58	—1.97	4,995	se.	30	s.	15	11	2	15	14
Fort McDowell	.....	.....	.....	.....	.....	.....	.....	.....	.....	91.8	.....	115.0	18	107.	67.0	24	76.3	48.0	.....	.....	.....	.....	.....	.....	0.90	.....	.....	.....	.....	.....	.....	3	.....	.....	.....
Fort Thomas	2,710	27.19	.....	29.78	29.92	13	29.67	4	0.26	81.5	+ 1.4	104.0	5	96.1	59.6	26	67.7	44.4	37.6	16	16.0	21	45.2	55.6	2.46	+0.06	.....	s.	.....	.....	.....	9	3	10	12
Fort Verde	.....	.....	.....	.....	.....	.....	.....	.....	.....	81.3	+ 0.9	107.0	1	95.2	62.0	25	67.4	45.0	.....	.....	.....	.....	.....	.....	3.01	—0.29	.....	.....	.....	.....	.....	9	.....	.....	.....
Maricopa	.....	.....	.....	.....	.....	.....	.....	.....	.....	92.6	.....	114.0	18	106.	67.0	27	79.3	47.0	.....	.....	.....	.....	.....	.....	0.92	.....	.....	.....	.....	.....	.....	3	.....	.....	.....
Phoenix	.....	.....	.....	.....	.....	.....	.....	.....	.....	83.1	.....	114.9	17	107.	48.9	30	59.2	66.0	.....	.....	.....	.....	.....	.....	0.71	—1.41	.....	.....	.....	.....	.....	7	.....	.....	.....
Prescott	5,389	24.80	+.01	29.80	29.91	14	29.70	21	0.21	70.8	+ 0.9	96.7	1	85.3	50.3	25	59.8	46.4	33.0	27	11.4	21	58.2	53.4	1.24	—2.04	4,012	s.	35	e.	2	11	2	14	15
San Carlos	.....	.....	.....	.....	.....	.....	.....	.....	.....	85.9	.....	110.3	3	99.8	63.0	20	71.9	47.3	.....	.....	.....	.....	.....	.....	1.22	—2.36	.....	.....	.....	.....	.....	8	.....	.....	.....
Wickenburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	87.2	+ 3.5	112.0	17	103.	65.0	27	71.8	47.0	.....	.....	.....	.....	.....	.....	2.10	+0.13	.....	.....	.....	.....	.....	6	.....	.....	.....
Willcox	.....	.....	.....	.....	.....	.....	.....	.....	.....	78.3	.....	106.0	5	95.5	50.5	19	61.2	55.5	.....	.....	.....	.....	.....	.....	2.10	.....	.....	.....	.....	.....	.....	9	.....	.....	.....
Middle plateau.																																
Winnemucca	4,332	25.63	+.06	29.84	30.01	17	29.62	6	0.38	71.1	+ 0.4	94.1	14	76.7	44.1	8	53.0	49.8	41.5	12	22.6	16	29.9	34.8	0.04	—0.06	4,023	sw.	32	sw.	16	1	0	6	25
Frisco	.....	23.79	.....	.....	.....	.....	.....	.....	.....	70.4	.....	91.6	2	80.5	43.7	8	61.1	48.9	33.5	8	12.1	21	42.1	43.4	3.96	.....	7,172	sw.	35	sw.	7	8	3	18	10
Salt Lake City	4,348	25.65	+.01	29.83	29.97	14	29.50	6	0.40	73.3	— 1.3	100.3	16	86.9	51.0	24	60.5	49.3	35.9	14	18.3	21	55.9	55.5	0.90	—0.06	3,921	se.	37	nw.	23	8	5	13	13
Montrose	.....	24.40	.....	29.80	29.96	14	29.75	20	0.21	65.8	.....	97.5	3	82.7	45.4	29	52.8	52.1	41.3	3	10.7	22	57.5	47.1	2.23	.....	5,518	se.	38	sw.	3	11	5	12	14
Fort Bridger	.....	23.63	.....	.....	.....	.....	.....	.....	0.33	58.7	.....	85.8	16	74.8	33.2	29	45.6	52.6	43.3	16	14.8	25	59.8	42.3	1.45	.....	3,433	sw.	32	sw.	13	10	5	13	13
Northern plateau.																																
Boisé City	2,750	27.14	.....	29.89	30.10	1	29.65	21	0.44	71.5	— 0.6	95.8	13	85.9	49.5	7	57.5	46.3	36.6	13	13.9	17	48.8	49.6	0.09	0.00	2,464	nw.	28	e.	17	4	1	8	22
Cœur d'Alene	.....	.....	.....	.....	.....	.....	.....	.....	.....	67.1	.....	98.0	18	84.8	41.0	28	49.4	57.0	.....	.....	.....	.....	.....	.....	trace	—0.08	.....	.....	.....	.....	.....	2	.....	.....	.....
Lewiston	785	29.14	.....	29.91	30.18	1	29.71	21	0.47	72.3	+ 0.3	105.2	18	88.2	51.5	27	58.1	53.7	42.2	13	13.4	23	46.4	47.7	0.41	+0.11	1,044	ne.	32	nw.	19	5	0	7	24
Ashland	.....	.....	.....	.....	.....	.....	.....	.....	.....	69.3	.....	98.0	17	89.0	42.0	7	49.6	50.0	.....	.....	.....	.....	.....	.....	0.00	.....	.....	.....	.....	.....	.....	0	.....	.....	.....
Lake View	.....	.....	.....	.....	.....	.....	.....	.....	.....	71.0	.....	101.0	15	87.3	46.2	8	54.7	54.8	.....	.....	.....	.....	.....	.....	0.43	.....	.....	.....	.....	.....	.....	4	.....	.....	.....
Linkville	.....	.....	.....	.....	.....	.....	.....	.....	.....	70.0	.....	93.0	17	80.1	44.0	8	59.9	49.0	.....	.....	.....	.....	.....	.....	0.00	.....	.....	.....	.....	.....	.....	0	.....	.....	.....
Dayton	1,667	28.24	.....	29.96	30.20	1	29.80	21	0.40	70.1	+ 3.4	108.7	18	89.4	45.0	27	53.5	63.7	50.0	13	19.2	22	56.4	44.4	0.07	—0.34	3,244	sw.	20	sw.	18	3	0	5	26
Fort Spokane	.....	.....	.....	.....	.....	.....	.....	.....	.....	68.8	.....	105.0	18	87.5	44.0	30	49.0	61.0	.....	.....	.....	.....	.....	.....	0.38	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
North Pacific coast region																																
Fort Canby	179	29.82	.....	30.02	30.19	1	29.79	20	0.40	57.8	.....	70.3	15	62.6	49.5	20	53.8	20.8	14.2	15	5.0	22	89.5	54.7	0.12	.....	4,243	n.	18	n.	16	1	3	16	12
Neah Bay	.....	.....	.....	.....	.....	.....	.....	.....	.....	61.4	.....	74.0	15	67.5	46.0	27	.....	27.0	.....	.....	.....	.....	.....	.....	0.05	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Olympia	36	29.98	—.02	30.02	30.25	1	29.76	21	0.49	62.9	— 1.2	92.2	12	75.6	44.2	10	49.1	48.0	41.3	12	6.8	27	79.8	54.1	0.00	—0.85	1,292	n.	15	n.	24	0	2	7	22
Port Angeles	14	30.00	.....	30.02	30.24	1	29.76	21	0.48	55.4	.....	74.0	12	64.6	42.6	3	48.1	31.4	29.5	11	7.9	5	86.8	51.4	0.00	.....	3,830	nw.	23	nw.	4	0	0	7	24
Pysht	.....	.....	.....	.....	.....	.....	.....	.....	.....	59.1	.....	75.0	15	69.9	42.0	18	48.2	33.0	.....	.....	.....	.....	.....	.....	0.00	.....	.....	.....	.....	.....	.....	0	.....	.....	.....
Astoria	.....	.....	.....	.....	.....	.....	.....	.....	.....	61.4	.....	74.0	15	67.5	51.0	20	55.3	23.0	.....	.....	.....	.....	.....	.....	0.02	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Portland	80	29.90	—.06	29.99	30.18	1	29.76	20	0.43	66.5	+ 1.3	94.5	11	82.5	47.5	10	52.8	47.0	43.5	11	11.0	22	66.6	53.7	0.00	—0.77	2,955	nw.	14	nw.	4	0	2	6	23
Roseburg	523	29.44	—.02	29.99	30.16	1	29.81	20	0.36	65.6	+ 0.5	91.6	16	82.3	46.1	27	51.6	45.5	40.4	28	12.0	22	63.1	51.1	trace	—0.44	1,822	n.	15	nw.	21	1	1	4	20
Mid. Pacific coast region																																
Cape Mendocino	637	29.28	.....	29.94	30.07	31	29.79	7	0.29	53.6	— 1.4	65	9	15	59.7	45.1	20	48.0	20.8	15.8	27	5.8	19	89.7	50.4	0.82	+0.71	19,134	n.	48	n.	11	0	1	9	21
Red Bluff	332	29.49	—.03	29.82	29.98	26	29.57	20	0.41	83.8	+ 3.4	107.5	17	97.7	58.5	30	66.8	49.0	39.0	14	22.5	22	30.1	45.7	0.00	—0.04	3,190	s.	14	s.	6	0	0	1	30
Sacramento	64	29.78	—.03	29.83	29.98	26	29.64	20	0.34	73.0	+ 1.2	105.0	17	91.9	51.5	30	59.8	53.5	42.0	31	21.5	6	53.2	53.3	0.00	0.00	5,164	s.	18	sw.	6	0	0	1	30
San Francisco	60	29.86	—.03	29.91	30.04	31	29.75	2	0.29	58.5	— 0.1	81.0	14	64.7	52.0	27	54.6	29.0	25.0	14	6.4	11	82.9	53.0	trace	—0.01	8,770	sw.	32	w.	15	0	6	20	5
South Pacific coast region																																
Los Angeles	371	29.54	—.02	29.89	30.02	26	29.74	20	0.28	72.7	+ 3.2	105.6	19	89.4	51.2	30	61.4	54.4	42.1	1	16.7	25	69.8	60.5	trace	0.00	3,097	w.	22	w.	18	0	1	14	16
San Diego	67	29.82	—.03	29.86	29.98	28	29.73	20	0.25	71.8	+ 3.0	89.0	18	78.6	62.0	31	66

ATMOSPHERIC ELECTRICITY.

AURORAS.

The following reports of auroral displays during August, 1885, have been received:

Fort Totten, Dakota: the auroral display of the evening of July 31 ended at 2.10 a. m., August 1st.

Manistique, Michigan, 1st: an aurora was observed from 9 to 11 p. m.

Bismarck, Dakota, 1st: an aurora was observed at 11.05 p. m., covering 85° of the northern horizon and extending to an altitude of 30°; the display ended at 11.50 p. m.

Fort Meade, Dakota, 1st: from 11 to 11.30 p. m. an auroral light was observed in the north, extending to an altitude of 3°.

Duluth, Minnesota, 1st: a very faint aurora was visible from 9.15 p. m. until after midnight; the display consisted of an occasional beam, or several beams, in the northern sky.

Marquette, Michigan, 1st: an aurora was observed at 10 p. m.; it consisted of an arch covering 20° of the northern horizon and extending to an altitude of 6° or 8°; streamers from the western part of the arch were also observed; the display ended at 11.40 p. m.

Eastport, Maine, 2d: a very faint auroral arch was observed from 8.10 to 9.30 p. m.; streamers extended to an altitude of 20°.

Auroral displays were also noted on the 2d at Gardiner and Orono, Maine, and Burlington, Vermont.

Saint Vincent, Minnesota, 4th: an aurora was observed from 11.20 p. m. until 3 a. m. of the 5th, when it was obscured by fog; the display extended over 40° of the horizon and consisted of a pale, whitish light, with occasional streamers.

Portland, Maine, 6th: an aurora was observed from 9.40 p. m. until 12.50 a. m of the 7th. It first appeared as a low arch covering about 80° of the horizon; a period of maximum brilliancy occurred at about 10.10 p. m., when a few streamers, scarcely perceptible, were observed. A second period of brilliancy occurred at 12.15 a. m. of the 7th, at which time the arch was much higher and more irregular in form; brilliant streamers also appeared, having a quite rapid motion from west to east.

Mount Washington, New Hampshire, 6th: a faint auroral light was observed from 9.35 p. m. until daylight of the 7th; streamers covered 90° of the horizon and extended to an altitude of 45°.

Gardiner, Maine, 6th: an aurora appeared at 9 p. m.; at 11 p. m. beams were visible; at 1.30 a. m. on the 7th the beams had disappeared, but the light remained.

The following stations also report the aurora of the 6th: Bangor and Orono, Maine; Cambridge, Massachusetts; Burlington and Newport, Vermont.

Mount Washington, New Hampshire, 7th: an aurora appeared at 9.27 p. m. and continued until the morning of the 8th; the display, though somewhat more extensive, resembled that observed on the previous evening.

Eastport, Maine, 7th: an auroral arch of about 15° altitude was observed from 9 p. m. until midnight.

Gardiner, Maine, 7th: a faint auroral display was visible from 8.30 p. m. until 1.30 a. m. of the 8th.

The display of the 7th was also observed at Bangor, Maine, and Newport, Vermont.

Mount Washington, 8th: a faint auroral light was visible soon after sunset; it continued until early morning of the 9th. This display was also seen at Newport, Vermont.

Vevay, Switzerland county, Indiana, 9th: a diffuse, crimson aurora, of moderate brilliancy, was observed at 3 a. m.; at 4 a. m. the display was somewhat brighter; during the appearance of the aurora, numerous meteors were seen.

Eastport, Maine, 11th: an auroral arch was observed from 7.30 to 8.45 p. m.; occasional streamers of pale, yellow color appeared at intervals, extending to an altitude of 30°. An aurora was also observed on the evening of the 11th, at Buckfield, Maine.

Yates Centre, Woodson county, Kansas, 12th: an aurora was observed at 8.30 p. m.; it consisted of bright bands in the east, extending to the "milky way" and inclining somewhat to the southward; at 9 p. m. an arch formed at an altitude of 40°. An auroral display was also observed on the 12th at Harvard, Nebraska.

Erie, Pennsylvania, 13th: an aurora was observed from 8.50 to 10.30 p. m., being most brilliant at 9.45; at times the lake was plainly seen by the light of the aurora.

Garrettsville, Ohio, 14th.

Gardiner, Maine, 15th: a brilliant aurora was visible at 1 a. m.; at 2.45 beams were observed.

New Haven, Connecticut, 16th: four auroral streamers, partly obscured by clouds, were observed in the northern sky at 3.20 a. m.

Erie, Pennsylvania, 18th: an aurora was observed at 8.20 p. m., covering 40° of the horizon and extending to an altitude of 15° or 20°; the display continued until 9.25 p. m.; it was not marked by any unusual features.

Astoria, Oregon, 26th: aurora was reported on this date by local newspapers, but was not seen by the observer.

Eastport, Maine, 27th: an auroral arch was observed from 7.30 to 11 p. m.

Fort Totten, Dakota, 28th: an aurora was observed from 10.50 p. m. until daylight of the 29th; the light extended to an altitude of 50°.

Eastport, Maine, 29th: an auroral arch was observed from 7 to 11 p. m.

Gardiner, Maine, 29th: at 8 p. m. bright aurora, with beams; the display ended at 9 p. m. An aurora was also observed on the 29th at Orono, Maine.

Burlington, Vermont, 31st.

THUNDER-STORMS.

Thunder-storms were reported in the various states and territories as follows:

Alabama.—1st, 2d, 4th, 5th, 8th to 14th, 16th, 19th, 21st, 26th.

Arizona.—1st to 19th, 21st, 22d, 29th, 30th.

Arkansas.—1st, 5th, 9th to 13th, 19th, 21st, 22d, 25th, 29th.

California.—3d, 4th, 5th, 13th to 18th.

Colorado.—1st, 3d, 4th, 6th, 8th, 10th to 13th, 15th, 18th, 20th to 26th, 28th, 29th, 31st.

Connecticut.—1st, 4th, 5th 11th, 13th, 18th, 19th, 20th, 22d to 25th.

Dakota.—1st to 7th, 9th to 12th, 15th to 20th, 23d, 28th.

Delaware.—12th, 13th, 22d, 25th.

District of Columbia.—1st, 2d, 3d, 13th, 14th, 19th, 22d, 23d, 25th, 30th.

Florida.—1st to 22d, 24th, 29th, 31st.

Georgia.—1st, 2d, 7th to 10th, 12th, 13th, 14th, 17th, 18th, 21st, 23d to 26th, 29th, 30th, 31st.

Idaho.—18th, 21st.

Illinois.—1st to 9th, 11th, 12th, 18th, 19th, 21st to 25th, 27th.

Indiana.—1st to 9th, 12th, 13th, 21st to 25th.

Indian Territory.—3d to 6th, 8th, 9th, 10th.

Iowa.—1st to 8th, 11th, 12th, 16th to 24th, 30th.

Kansas.—1st to 16th, 18th, 20th to 25th, 28th to 31st.

Kentucky.—1st, 2d, 4th, 7th, 12th, 16th, 20th, 22d, 23d, 24th.

Louisiana.—1st, 2d, 4th, 9th to 14th, 19th to 23d, 25th, 26th.

Maine.—1st; 4th, 5th, 11th, 13th, 14th, 17th, 18th 19th, 21st, 22d.

Maryland.—1st, 2d, 3d, 9th, 12th, 13th, 22d, 24th, 25th, 31st.

Massachusetts.—1st to 5th, 8th, 11th, 12th, 13th, 17th, 18th, 19th, 22d, 24th, 31st.

Michigan.—1st, 3d, 4th, 6th, 8th, 9th, 12th, 13th, 17th, 18th, 21st, 22d, 23d, 29th, 31st.

Minnesota.—2d, 3d, 5th, 7th to 12th, 15th, 16th, 17th, 20th, 29th.

Mississippi.—11th, 25th.

Missouri.—1st, 2d, 10th, 11th, 12th, 19th, 21st, 22d, 24th, 25th, 29th.

Montana.—3d to 7th, 10th, 14th, 22d, 23d, 26th, 27th.
Nebraska.—1st, 3d to 8th, 11th, 14th, 16th, 18th, 22d, 23d, 24th, 26th, 27th, 28th, 30th, 31st.
Nevada.—4th, 14th to 18th, 20th.
New Hampshire.—1st, 5th, 12th, 13th, 21st, 22d.
New Jersey.—1st to 5th, 7th, 11th, 12th, 13th, 15th, 17th, 18th, 19th, 21st to 26th, 30th.
New Mexico.—1st, 2d, 5th, 9th, 10th, 11th, 25th, 27th, 28th, 30th, 31st.
New York.—1st to 5th, 8th to 14th, 17th to 22d, 24th, 25th, 27th, 29th, 30th, 31st.
North Carolina.—1st to 11th, 13th, 14th, 24th, 25th, 28th, 31st.
Ohio.—1st to 10th, 12th, 13th, 16th, 18th to 25th, 30th, 31st.
Oregon.—Albany, 20th.
Pennsylvania.—1st to 5th, 9th, 12th, 13th, 17th to 25th, 30th, 31st.
Rhode Island.—1st, 2d, 5th, 13th, 15th, 19th, 24th, 25th.
South Carolina.—1st, 2d, 8th, 13th, 14th, 16th, 17th, 19th, 22d, 24th, 25th, 28th.
Tennessee.—1st to 4th, 6th, 14th, 16th, 17th, 21st, 24th, 25th, 30th.
Texas.—1st, 2d, 3d, 7th to 23d, 25th to 31st.
Utah.—4th to 7th, 9th, 10th, 12th, 17th, 19th to 28th, 31st.
Vermont.—1st, 4th, 11th, 12th, 13th, 17th to 22d, 26th to 29th, 31st.
Virginia.—1st, 2d, 3d, 5th, 7th, 10th, 12th, 13th, 19th, 22d to 26th, 30th.
Washington Territory.—18th, 19th, 22d.
West Virginia.—3d, 4th, 7th, 11th, 12th, 13th, 17th, 22d, 24th, 25th.
Wisconsin.—1st to 4th, 6th to 9th, 12th, 16th, 17th, 18th, 20th, 21st, 23d, 24th, 30th.
Wyoming.—1st, 3d, 5th, 8th, 11th.

ELECTRICAL PHENOMENA.

The observer on the summit of Mount Washington, New Hampshire, reports that during a light shower of rain, which began at 11.20 p. m. on the 12th, the anemometer cups were surrounded by a halo of electric light.

The observer on the summit of Pike's Peak, Colorado, reports that during a thunder-storm on the afternoon of the 29th the atmosphere was charged with electricity to an unusual degree, and that during a fall of sleet and hail, from 7.46 to 8.20, a buzzing noise, resembling that made by bees, came from all pointed objects.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various states and territories as follows:

Arkansas.—Lead Hill, 10th, 16th, 22d, 26th, 29th.
California.—San Diego, 1st, 2d; San Francisco, 19th.
Dakota.—5th, 7th, 16th, 23d to 26th, 31st.
Florida.—Key West, 10th, 15th.
Georgia.—Atlanta, 12th.
Illinois.—Riley, 11th, 20th; Swanwick, 19th, 23d.
Iowa.—1st, 4th, 5th, 12th, 13th, 14th, 17th, 20th, 25th, 26th.
Kansas.—Wyandotte, 18th, 19th.
Maine.—Cornish, 3d, 21st.
Michigan.—2d, 3d, 7th, 8th, 11th, 20th, 22d, 27th, 31st.
Missouri.—Lamar, 9th; Saint Louis, 23d.
Nebraska.—Harvard, 14th, 18th; Fairbury, 18th; Tecumseh, 28th.
Nevada.—Carson City, 19th, 21st.
New Hampshire.—Mount Washington, 12th.
New York.—17th, 20th, 21st, 27th, 29th.
Ohio.—6th, 8th, 9th, 12th, 18th, 20th, 29th.
Pennsylvania.—Wellsborough, 19th; Pittsburg, 28th.
Tennessee.—Nashville, 6th, 16th, 22d, 28th, 30th.
Texas.—Fort Concho, 18th, 19th, 20th; Galveston, 20th; Indianola, 27th.
Virginia.—Dale Enterprise, 13th, 27th, 30th.
Wyoming.—Fort Bridger, 21st.

LUNAR HALOS.

Lunar halos were observed in the various states and territories as follows:

Alabama.—Mobile, 19th to 22d.
Arizona.—Wickenburg, 17th; Prescott, 16th.
California.—San Diego, 23d.
Colorado.—Montrose, 19th.
Dakota.—Bismarck and Webster, 25th.
Florida.—13th, 17th to 22d, 24th to 27th, 29th.
Georgia.—Atlanta, 19th.
Illinois.—Springfield, 23d; Riley, 26th.
Indiana.—Logansport, 23d; Vevay, 19th.
Iowa.—Davenport, 27th; Burlington, 29th.
Kansas.—14th, 18th, 21st, 25th.
Louisiana.—New Orleans, 20th.
Maryland.—Baltimore, 21st, 24th.
Massachusetts.—Milton and Readville, 29th.
Michigan.—19th, 20th, 23d, 24th, 26th.
Missouri.—Saint Louis, 24th.
Nebraska.—De Soto, 16th; Harvard, 19th.
New Hampshire.—Mount Washington, 27th.
New York.—Buffalo, 22d; Le Roy, 23d.
Ohio.—Toledo, 1st; Cleveland, 19th; Napoleon, 22d; Cincinnati, 23d.
Pennsylvania.—Wellsborough, 12th, 18th, 24th; Pittsburg, 26th.
South Carolina.—Spartanburg, 19th; Stateburg, 19th, 21st.
Tennessee.—16th, 21st, 22d, 24th, 28th, 29th, 30th.
Texas.—16th to 22d, 26th, 27th.
Utah.—Frisco, 21st.
Virginia.—7th, 13th, 16th, 18th, 22d, 23d, 27th, 28th.
Wyoming.—Fort Bridger, 21st, 23d, 26th.

The phases of the moon during August were: last quarter, 3d, 4.50 p. m.; new moon, 10th, 7.08 a. m.; first quarter, 17th, 8.41 a. m.; full moon, 25th, 12.19 p. m.; perigee, 9th, 5.18 a. m.; apogee, 21st, 12.54 p. m.

MIRAGE.

Mirage was observed at the following stations during the month:

Salina, Kansas, 16th.
Maud, Kansas, 22d, 23d.
Reidsville, North Carolina, 10th.
Indianola, Texas, 28th.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Prof. David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for August, 1885:

Date—August, 1885.	No. of new.		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
4, 5 p. m...	1	1	.....	.....	1	1	3	25‡	
6, 6 p. m...	0	3‡	0	0	.....	.....	3	30‡	
8, 5 p. m...	4	40‡	.....	.....	.....	.....	7	70‡	
9, 5 p. m...	1	25‡	0	0	1	3	6	90‡	
11, 3 p. m..	0	0	.....	.....	0	0	4	80‡	
14, 3 p. m...	.....	.....	.....	.....	.....	.....	5	55‡	
15, 6 p. m...	0	0	0	5‡	0	0	5	50‡	
16, 4 p. m...	0	0	0	5‡	0	0	5	35‡	
17, 4 p. m...	0	0	1	5‡	0	0	4	20‡	
20, 7 a. m...	0	0	0	0	0	0	4	20‡	
22, 4 p. m...	1	2	.....	.....	1	2	3	15‡	
26, 11 a. m..	.....	.....	.....	.....	.....	.....	3	40‡	
27, 12 m	0	0	0	0	0	0	3	45‡	
28, 12 m	2	7	0	0	1	5	5	55‡	
30, 3 p. m...	0	20‡	.....	.....	.....	.....	4	75‡	
31, 9 a. m...	1	20‡	1	5‡	0	0	4	90‡	

Faculæ were seen at the time of every observation. ‡ Approximated.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and sixty-five stations show 5,025 observations to have been made, of which four were reported doubtful; of the re-

mainder, 5,021, there were 4,230, or 84.2 per cent., followed by the expected weather.

The following notes, concerning the sun-glows during August, have been reported:

Albany, Oregon: beautiful, bright after-glows were observed on the 2d, 3d, 4th, 6th, 7th.

Wellington, Kansas: prominent sunset after-glows were noted on the evenings of the 7th, 8th, 16th, 27th, 29th.

Sterling, Kansas: bright sun-glows were observed at intervals during the month.

Vevay, Indiana: yellow or orange sunsets were observed on the 1st, 5th, 13th, 15th, 17th, 20th, 28th, 30th; rosy sunsets were observed on the 3d, 8th, 9th, 10th, 16th.

Sunman, Indiana: the brilliant sunsets of 1883 and 1884 reappeared during August; they were noted on the following dates: 9th, 10th, 14th, 15th.

Logansport, Indiana: the western horizon was brilliantly illuminated with yellow, orange, and pink hues on the evenings of the 25th and 27th.

Dale Enterprise, Virginia: the bright sun glows of last year reappeared during the last week in August.

DROUGHT.

Charleston, Illinois: the month opened with drought prevailing; on the 2d it was relieved by an abundant rain.

Mahanoy Plane, Schuylkill county, Pennsylvania: the rain storm which occurred on the afternoon of the 1st ended a severe drought in this vicinity. At some of the collieries water had to be hauled several miles.

Indianola, Texas, 1st: rain is much needed in this part of the state.

Lamar, Missouri, 9th: corn and other crops in this vicinity are suffering from drought.

Atkins, Pope county, Arkansas, 10th: hot and dry weather prevails in the Arkansas Valley from Fort Smith to Little Rock, and is seriously injuring the crops.

Palestine, Texas, 11th: rain is much needed in this vicinity; pastures are badly burned and many wells have failed; the cotton crop is also suffering.

Galveston, Texas, 14th: reports from nearly every part of the state indicate that drought has caused considerable damage to the cotton crop during the last ten days.

Marianna, Lee county, Arkansas, 20th: but little rain has fallen in this part of the state during the last thirty days, and corn and cotton are suffering in consequence.

Bowie, Montague county, Texas, 20th: during the past seven weeks but little rain has fallen in this locality. The cotton crop in this and adjoining counties has been seriously injured.

Dale Enterprise, Rockingham county, Virginia: drought prevailed in this part of the state throughout August. The water-supply for milling purposes was insufficient, and the pastures were dry and parched.

Nashville, Tennessee: at the close of the month severe drought prevailed in this vicinity. The rainfall for the month was but 1.02 inches, which is less than one-third of the average rainfall for August.

Wellington, Sumner county, Kansas: the dry weather during August prevented the maturing of crops. Ploughing, for seeding autumn wheat, has been delayed on account of the dryness of the soil.

Westmoreland, Pottawottomie county, Kansas: August was a hot month, with but little rainfall, which was very unevenly distributed. In some localities crops have been injured by drought.

East Portland, Oregon: no rain fell at this place during the month of August.

Bainbridge Island, Washington Territory, 30th: gardens have been seriously injured by drought.

EARTHQUAKES.

The Charleston (South Carolina) "News and Courier" of August 21, 1885, contained the following:

RALEIGH, N. C., Aug. 20.—There were violent shocks of earthquake last Thursday in the Blue Ridge Mountains in Watauga county. At first there were noises like thunderclaps, while the sky was cloudless, then the earth shook, and terrible noises were heard. These were felt for many miles, at the height of 4,100 feet, and in Grandfather Mountains, 6,000 feet; people were frightened so that they fled. The noises and shocks were felt at Boone.

Garrettsville, Portage county, Ohio: a severe shock, which is supposed to have been due to an earthquake, was experienced at 11.05 p. m. on the 14th.

The following is an extract from "Science," of August 28, 1885:

The schooner "Rosario," at New York, reports that on June 23d, in lat. 29° 14′ N., long. 133° 35′ W., at 11 a. m., two heavy shocks of submarine earthquake were experienced. These were about one minute apart; and the last was much heavier than the first, causing the vessel to tremble violently. The sky was overcast and the sea remarkably smooth.

FOREST AND PRAIRIE FIRES.

Santa Rosa, California: the mountains in this vicinity were almost obscured by smoke from forest fires on the 31st.

Pleasant Grove, Washington Territory: during the month the atmosphere in this region has been filled with smoke from forest fires.

Tacoma, Washington Territory: forest fires have prevailed during the entire month in this region, rendering navigation on the Sound difficult, and to some extent dangerous.

Albany, Oregon, 8th, 9th.
Fort Concho, Texas, 13th.
Fort Maginnis, Montana, 15th, 16th.
San Diego, California, 17th.
Los Angeles, California, 19th.
Fort Yates, Dakota, 23d to 26th.
Linkville, Oregon, 24th.

INSECTS.

Fort Buford, Dakota, 26th: locusts have gradually disappeared from this part of the country. The grain fields were not injured, but pastures were to some extent damaged.

Rochester, New York: an immense swarm of butterflies was observed on the 26th, approaching "Windsor Beach" from over the lake. When some distance from the shore it resembled a dark cloud and upon reaching "Windsor Beach" all objects were covered with them.

Poplar River, Montana, 30th: locusts have almost entirely disappeared; they have, apparently, migrated eastward.

Muscatine, Muscatine county, Iowa, 31st: grasshoppers have been quite destructive to crops in this part of the state during the month.

Wauseon, Fulton county, Ohio, 31st: grasshoppers were quite numerous during the month, and caused considerable injury to corn and oats in this county.

Fort Madison, Lee county, Iowa, 31st: grasshoppers have been very destructive during the month, especially to late corn, meadows, and gardens.

METEORS.

Little Rock, Arkansas, 3d: five meteors were observed between 9.30 and 10 p. m.

Nashville, Tennessee: numerous small meteors were observed from 8.40 p. m. on the 4th until daylight on the 5th; they were observed at intervals of from five to twenty seconds.

Mount Washington, New Hampshire, 8th: from 9.30 to 10 p. m. a meteoric display was observed; three or four meteors per minute were observed for thirty minutes.

Dover, New Jersey, 8th: during the evening a large and bright meteor was observed in the east at an altitude of 75°; it moved westward a few degrees and then disappeared, leaving a brilliant trail which remained visible for several seconds.

Concordia, Kansas, 9th: at 9.45 p. m. a large and brilliant meteor, of yellowish color, was observed shooting across the sky from northwest to southeast; about one minute after its disappearance a loud report, like that of a cannon, was heard.

Riley, Illinois, 10th: numerous bright meteors were observed at about 9.15 p. m.

Smithville, North Carolina, 10th: from 9.30 to 10 p. m.

twelve meteors were observed, all moving from the northeast in a southwesterly direction.

Fort Myer, Virginia, 10th: from 8 to 11 p. m. a large number of meteors were seen; at 11 p. m. two very brilliant meteors were noted.

Wellington, Kansas: during the night of the 10–11th a large number of meteors were observed; in two hours fifty-five were counted, each one diverging from the north and pursuing a southerly course.

Muscatine, Iowa, 11th: at about 2 a. m. fifteen meteors were observed in ten minutes, all going south.

Beverly, New Jersey, 11th: three meteors were observed between 8 and 9 p. m.

Columbus, Ohio, 11th: a large number of meteors were observed during the evening.

Rio Grande City, Texas, 14th: a large number of small meteors were observed during the night. A large and brilliant one was seen at 10.25 p. m.; it started from a point about 4° east of the zenith, and fell slowly southward to within 20° of the horizon, where it disappeared. Its flight was of about three seconds' duration.

Lead Hill, Arkansas, 14th: at about 8 p. m. a large and bright meteor was seen in the northeast; it was visible about three seconds and produced a bright light resembling a flash of lightning.

Meteors were also observed in the various states and territories as follows:

Alabama.—Green Springs, 10th, 11th.
Arizona.—Fort Grant, 15th.
Arkansas.—Little Rock, 9th; Lead Hill, 8th, 10th, 11th.
California.—Princeton, 7th to 13th, frequent.
Connecticut.—New Haven, 5th; Bethel, 8th to 11th.
Dakota.—Webster, 9th.
Florida.—Limona, 2d, 3d, 5th to 10th, numerous; Manatee, 4th, 8th.
Illinois.—Swanwick, 1st; Riley, 4th; Charleston, 5th, 9th, 14th, 27th; Wilton Centre, 10th, numerous; Cairo, 15th.
Indiana.—Terre Haute, 5th, 8th, 11th, numerous; Logansport, 7th, 10th; Vevay, 10th, 11th, 13th.
Iowa.—Davenport, 4th, 10th; Dubuque and Muscatine, 10th; Burlington, 14th, 15th.
Kansas.—Salina, 3d, 7th, 8th, 12th, 28th; Allison, 5th, 6th, 9th to 13th, 16th, 27th.
Kentucky.—Richmond, 14th.
Maine.—Eastport, 7th; Buckfield, 11th.
Maryland.—Woodstock, 3d, 5th, 10th, 11th.
Massachusetts.—Taunton, 4th, 8th, 11th, 12th, 21st; Fall River, 9th to 11th, numerous; Milton, 12th; Rowe, 20th.
Michigan.—Lansing, 10th.
Minnesota.—Rochester, 9th.
Nebraska.—Harvard, daily from 7th to 20th; Genoa, 9th, 12th; Crete, 10th.
New York.—Factoryville, 8th; Le Roy, 10th, 11th; Ithaca, 20th.
Ohio.—Cincinnati, 6th; Hiram, 10th.
Oregon.—Albany, 10th, 11th.
Pennsylvania.—Quakertown, 10th.
South Carolina.—Stateburg, 3d, 8th, 9th, 10th.
Tennessee.—Nashville, 4th, 5th, 9th.
Texas.—Cleburne, 6th, 8th, 9th, 10th; Fort Concho, 8th; Brownsville, 9th.
Utah.—Nephi, 9th, 10th.
Vermont.—Woodstock, 8th.
Virginia.—Chincoteague, 9th, 10th, 12th; Dale Enterprise, 9th, 13th; Fort Myer, 10th; Wytheville, 10th, 20th.
Wisconsin.—Beloit, 10th; Madison, numerous meteors were observed during the first half of the month.

MIGRATION OF BIRDS.

Geese flying southward.—Portland, Oregon, 27th, the first seen this season; geese were also seen in large numbers on the 30th.

Ducks flying northward.—Harvard, Nebraska, 12th.
Ducks flying southward.—Harvard, Nebraska, 12th; Poplar River, Montana, 7th.
Cranes flying southward.—Nephi, Utah, 11th.

POLAR BANDS.

Dale Enterprise, Virginia, 1st, 19th, 27th.
Clear Lake, Arkansas, 16th, 17th, 18th.
Montrose, Colorado, 4th, 18th.
Riley, Illinois, 1st, 20th, 22d, 31st.
Salina, Kansas, 12th, 15th, 16th, 23d, 29th.
Gardiner, Maine, 28th.
Somerset, Massachusetts, 14th, 15th.
Amherst, Massachusetts, 26th.
Escanaba, Michigan, 1st.
Mountainville, New York, 29th.
Wauseon, Ohio, 16th.
Nashville, Tennessee, 16th, 17th.
Rio Grande City, Texas, 3d, 12th, 13th, 21st, 24th, 26th.
Wytheville, Virginia, 26th.

SAND STORMS.

Wickenburg, Arizona, 5th, 6th, 19th.
Fort McDowell, Arizona, 4th, 15th.
Maricopa, Arizona, 10th.
San Diego, California, 18th.
Los Angeles, California, 18th, 19th.
Point Pleasant, Louisiana, 10th.

WATER-SPOUTS.

The British schooner "Mary Jane," at Yarmouth, Nova Scotia, on the 18th, from the West Indies, reports having observed, on the 9th, in N. 36° 30′, W. 65° 45′, a large water-spout, which remained visible for thirty minutes.

The s. s. "Valencia," M. Santamarina, commanding, passed a water-spout, on the 19th, when in N. 27° 44′, W. 47° 22′.

The British s. s. "Manitoban" on the 29th, at 2.30 p. m., in N. 51° 11′, W. 58° 53′, observed a well-defined water-spout.

ERRATA.

On page 168, in the REVIEW for July, 1885, in the table giving the average velocity, etc., for the "Areas of low barometer," the heading for the sixth column should read "10 p. m. to 7 a. m." (not 11 p. m. to 7 a. m), and that for the eighth column should read "3 p. m. to 10 p. m." (not 3 p. m. to 11 p. m).

In the August REVIEW, page 182, under "Verifications," the percentage of special indications verified at Buffalo, New York, given as 81.45, should read 97.0.

Meteorological record of voluntary observers and Army post surgeons, August, 1885.

The maximum and minimum temperatures at stations marked thus (*) are from readings of other than standard instruments.

Stations.	Temperature. Maximum.	Minimum.	Mean.	Rainfall.	Stations.	Temperature. Maximum.	Minimum.	Mean.	Rainfall.
Alabama.	°	°	°	*Inches*	*California*—Cont'd.	°	°	°	*Inches*
Greensborough *	96	65	80.2	2.23	Presidio of San F...	83	48	57.5	0.00
Mount Vernon B'ks..	99	61	80.9	4.20	Princeton *	109	54	79.0	0.00
Arizona.					Ross Valley *	101	41	.....	.....
Fort McDowell	110	67	91.7	0.56	Sacramento *	102	50	71.5	0.00
Tucson	.....	.....	.....	1.76	Salinas *	76	52	58.9	0.00
Arkansas.					Santa Rosa *	92	51	62.7	0.00
Lead Hill *	104	53	78.4	4.14	*Colorado.*				
Mount Ida *	95	56	73.3	1.90	Braddock	81	22	.....	.....
California.					Lyon, Fort	102	54	76.8	1.85
Alcatraz Island	70	49	55.9	0.00	Pueblo	95	55	71.1	4.62
Angel Island	84	50	60.1	0.00	*Connecticut.*				
Benicia Barracks	98	53	67.2	trace.	Bethel	.....	.....	.....	5.80
Bidwell, Fort	94	53	72.1	trace.	Hartford	88	41	65.7	8 84
Blue Lake	96	45	64.6	0.00	North Colebrook *	87	49	67.5	5 78
Cahuenga Valley *	105	.....	.....	.....	North Stamford *	86	52	67.6	.....
College City *	114	48	79.8	trace	Voluntown *	90	50	.....	6.55
Fall Brook *	115	60	72.5	0.02	*Dakota.*				
Gaston, Fort	108	45	72.0	trace	Abr. Lincoln, Fort..	96	38	63.9	2.50
Mason, Fort	80	50	58.9	0.00	Buford, Fort	91	38	63.5	1.53
Murrieta *	111	.....	75.8	0.70	Meade, Fort	95	40	65.1	3.22
Oakland *	85	53	61.0	0.00	Pembina, Fort	90	27	59.9	1.20
Oroville *	102	63	82.1	0.00	Randall, Fort	91	39	67.9	5.17
Poway *	103	64	75.8	trace	Richardtown *	94	42	61.6	2.80

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature. Maximum.	Minimum.	Mean.	Rainfall.
Dakota—Continued.	°	°	°	*Inches*
Sisseton, Fort	89	33	62.3	1.53
Sully, Fort	90	40	67.6	3.51
Totten, Fort	88	37	61.6	2.17
Vermillion	95	39	.....	3.87
Webster*	99	44	67.1	1.41
Yates, Fort	97	41	65.6	1.10
District of Columbia.				
Distributing Resv'r*	93	51	76.5	7.31
Receiving Reserv'r.*	93	55	76.2	5.86
Rock Creek*	97	56	78.1	.....
Florida.				
Archer	94	70	79.1	10.23
Limona*	98	71	82.9	1.85
Manatee*	93	77	84.4	5.27
Mayport*	93	75	81.0	7.59
Merritts Island	94	73	80.6	10.28
Saint Augustine, Fl	93	70	79.4	8.67
Tallahassee*	92	73	81.0	9.87
Georgia.				
Athens	96	58	76.5	7.05
Forsyth*	95	64	78.8	5.38
Milledgeville*	94	66	79.8	7.70
Illinois.				
Anna	96	52	75.8	4.13
Bunker Hill*	96	47	72.3	3.90
Collinsville	93	47.8	70.4	2.93
Charleston*	96	45	71.1	6.47
Mattoon*	95	51	75.2	7.80
Peoria*	97	52	73.2	2.64
Riley*	84	45.7	64.1	6.80
Rockford*	84	48	65.3	9.18
Sandwich*	96	53	74.3	3.19
Swanwick*	87	50	68.7	6.99
Sycamore	86	47	64.4	9.90
Wilton Centre	96	42	66.8	7.79
Windsor*	94	41	72.0	11.02
Indian Territory.				
Reno, Fort	99	53	77.8	2.66
Indiana.				
Fort Wayne*	96	50	69 0	4.77
Guilford*	90	49	70.5	5.46
Jeffersonville	95.2	52	80.0	2.08
Laconia*	96	52	75.0	4.30
Lafayette	94	42	68.3	4.93
LaGrange*	90	43	65.5	4.75
Logansport*	100	45	70.4	2.72
Mauzy*	92	41	67.2	4.75
Spiceland	94	46	68.7	5.20
Sunman*	94	48	73.0	7.48
Terre Haute*	90	52	.....	.....
Vevay	96	51	74.3	3.82
Iowa.				
Cedar Rapids* A	88	41	66.2	.....
Cedar Rapids B	87	43	67.0	7.71
Cresco*	82	45	63.1	4.45
Des Moines	89	42	67.8	.....
Guttenburg*	88	44	65.3	4.70
Humboldt*	90	42	63.5	.....
Independence*	81	47	65.8	7.10
Indianola*	89	49	67.5	7.98
Logan*	98	48	70.4	5.40
Madison, Fort*	95	49	.....	3.50
Manchester	87	43	67.0	7.71
Maynard*	88	40	62.1	.....
Monticello	88	41	65.8	8.54
Muscatine*	92	45	68.8	7.38
Oskaloosa A	.....	.....	66.9	7.09
Oskaloosa* B	94	65	.....	.....
Ottumwa*	91	54	70.3	4.48
Round Grove*	86	50	.....	.....
West Union*	86	45	62.9	7.58
Kansas.				
Allison*	107	48	71.3	2.05
Atchison*	94	54	72.8	4.05
Clay Centre*	100	66	79.2	1.45
Independence*	95	55	74.8	7.46
Leavenworth, Fort*	97	52	.....	5.15
Manhattan A	98	41	74.1	0.89
Manhattan* B	98	50	73.2	1.48
Maud*	104	54	80.9	.....
Salina*	84	67	75.2	3.03
Sterling*	97	54	72.0	2.02
Topeka*	99	57	74.0	4.83
Wellington*	101	49	74.4	0.61
W. Leavenworth	97	52	.....	5.15
Westmoreland*	101	47	77.8	2.12
Wyandotte*	94	53	73.2	7.86
Yates Centre*	92	52	74.1	2.28
Kentucky.				
Frankfort	94.2	52.0	75.3	1.88
Richmond	94	48	74.8	1.90
Louisiana.				
Grand Coteau	97	66	82.0	7.57
Liberty Hill*	94	76	85.9	2.79
Luling*	93	61	.....	8.39
Point Pleasant*	96	68	79.5	5.30
Maine.				
Buckfield*	86	45	.....	11.10
Cornish*	88	45	64.4	6.08
Gardiner	82	43	63.5	3.21
Orono*	84	44	63.3	7.36
Preble, Fort	79	53	65.5	1.96
Maryland.				
Cumberland	88	45	70.4	3.87
Fallston*	90	50	70.4	10.75
Great Falls*	94	50	74.4	6.03
McDonogh	87	45	71.1	5.05
McHenry, Fort	91	52	72.9	7.70
Woodstock	91	45	71.0	6.43
Massachusetts.				
Amherst A	87	45	66.4	7.62
Amherst B	87	34	66.0	8.31
Dudley	85	32	48.2	5.90
Fall River*	87	46	.....	5.17
Leicester	86	39	65.2	7.71
Mendon*	82	51	66.2	.....
Milton	85	51	65.3	5.89
New Bedford	86	45	67.1	4.14
Princeton	84	39	62.9	6.89
Readville	80	43	64.6	6.28
Rowe*	84	46	62.2	7.37
Somerset*	94	44	71.2	4.18
Taunton	90	43	68.3	4.10
Westborough*	90	40	68.9	7.19
Williamstown	89	34	61.5	6.65
Worcester*	82	45	64.5	6.52
Michigan.				
Brady, Fort	82	42	58.8	2.24
Buchanan*	93	48	68.8	.....
Harrisville*	82	40	.....	4.77
Hudson*	88	37	63.1	4.54
Kalamazoo*	83	43	.....	8.94
Lansing	83	41	63.3	6.75
Manistique	85	37	59.9	5.32
Mendon	90	44	.....	3.00
Northport*	84	46	.....	2.35
Thornville	86	44	64.7	5.15
Traverse City*	87	43	.....	6.95
Minnesota.				
Minneapolis*	86	45	63.8	3.59
Northfield	84	38	63.8	4.16
Rochester*	88	33	.....	2.19
Snelling, Fort	87	38	65.1	3.10
Missouri.				
Carthage	94	53	75.6	4.30
Conception	80	53	70.8	1.85
Independence*	90	52	73.8	9.36
Pierce City*	98	51	74.5	7.20
Springfield	92	53	73.0	3.73
Montana.				
Assinaboine, Fort	99	37	66.1	0.54
Ellis, Fort	95	33	62.2	1.25
Keogh, Fort	93	39	67.0	0.32
Shaw, Fort	97	39	63.1	1.35
Nebraska.				
Crete	91	47	69.0	2.70
De Soto*	92	44	68.7	4.02
Fairbury*	97	70	85.5	1.04
Falls City*	94	50	71.3	1.45
Fremont	99	47	68.8	5.11
Genoa	93	51	68.5	4.09
Madison*	85	50	60.1	0.25
Marquette*	90	59	.....	3.79
Robinson, Fort	96	38	70.7	1.41
Stockham*	96	64	83.1	7.75
Tecumseh*	96	52	70.2	1.93
Nevada.				
Carson City	99	42	70.9	0.10
McDermitt, Fort	102	46	72.9	0.16
New Hampshire.				
Antrim	.....	.....	.....	6.00
Ashland	.....	.....	.....	6.51
Belmont	.....	.....	.....	5.95
Bristol	.....	.....	.....	8.58
Lake Village	.....	.....	.....	7.97
Nashua	.....	.....	.....	5.75
Wier's Bridge	.....	.....	.....	7.42
Wolfborough	.....	.....	.....	7.08
Woodstock	.....	.....	.....	12.92
New Jersey.				
Beverly*	95	50	72.2	6 83
Dover	88	40	68.0	7.00
Paterson*	90	51	71.0	6.48
Phillipsburg*	92	45	71.4	7.35
Princeton	90	49	71.2	5.49
Readington*	94	52	74.7	4.60
Salem*	94	56	75.4	10.09
Somerville*	91	54	71.2	4.03
South Orange*	88	54	66.8	7.55
Vineland	92	58	69.3	5.11
New Mexico.				
Gallinas Spring	95	60	.....	2.51
Union, Fort	94	44	67.4	4.76
Wingate, Fort	93	46	67.8	1.14
New York.				
Auburn	83	43	66	6.33
Columbus, Fort	89	51	71.7	5.17
Cooperstown*	82	44	63.5	9.08
David's Island	90	47	70.2	5.16
Factoryville*	94	42	64.5	3.94
Humphrey	85	47	64.3	10.11
Ithaca	87	40	64.6	8.14
Le Roy	90	38	68.9	4.85
Madison Barracks	85	40	63.8	2.29
Menand Station*	86	52	66.5	8.19
New York—Cont'd.				
Mountainville	90	43	67.5	7.86
Niagara, Fort	86	50	65.9	3.98
North Volney*	80	46	63.2	2.20
Palermo*	86	42	61.6	2.98
Pen Yan	.....	.....	.....	4.27
Plattsburg B'ks	83	43	64.3	2 10
Setauket	88	51	.....	6.43
West Point	91	40	69.8	7.50
White Plains	84	54	69.9	8.30
North Carolina.				
Flat Rock*	87	56	69.1	3.85
Lenoir*	88	55	....	3.20
Lincolnton*	84	62	76.0	3.68
Raleigh*	97	62	79.0	6.40
Reidsville*	93	68	73.8	.....
Statesville*	92	55	78.2	2.77
Weldon*	98	58	77.5	1.32
Ohio.				
Cleveland*	86	44	66.5	4.90
Clyde*	87	48	.....	6.22
College Hill*	98	54	76.3	4.10
Garrettsville	88	38	64.3	7.44
Hiram*	90	48	66.1	6.66
Jacksonborough*	101	49	71.4	5.35
Napoleon*	84	47	68.6	3.60
North Lewisburg	94	47	74.1	7.55
Portsmouth	90	50	71.9	5.52
Ruggles*	88	48	64.4	6.35
Tiffin*	94	50	71.0	9.39
Wauseon	91	40	65.8	4.36
Westerville	90	45.5	65.5	5.96
Yellow Springs*	92	45	69.4	0.47
Oregon.				
Albany*	92	50	67.0	0.02
Bandon*	69	44	53.5	0.02
East Portland*	90	48	.....	0.00
Eola*	90	50	66.2	0.00
Klamath, Fort	105	62	86.5	1.35
Pennsylvania.				
Altoona	93	43	71.2	5.67
Blooming Grove*	90	48	..	9.20
Catawissa	90	44	67.0	7.36
Chambersburg*	96	52	74.7	5.04
Drifton	90	40	65.1	7.44
Dyberry*	80	36	63.7	8.77
Easton A	.....	.....	.....	7.70
Easton B*	92	55	73.7	.....
Fallsington	90	51	69.2	7.56
Franklin*	84	40	60.1	6.22
Germantown*	89	49	.....	8.80
Grampian Hills*	90	42	66.6	8.03
Mahanoy Plane*	89	53	70.2	9.99
Quakerstown	88	44	67.4	8.34
South Bethlehem	94	46	69.2	8.64
Troy	94	36	64.6	3.61
Wellsborough*	90	40	65.9	1.52
West Chester	89	47	69.9	.....
Wilkesbarre	93.4	41.1	66.6	7.92
Wysox*	88	48.8	68.4	5.15
South Carolina.				
Kirkwood*	86	64	75.9	2.80
Pacolet*	85	63	70.5	2.69
South Carolina—C'd.				
Spartanburg*	80	42	.....	3.30
Stateburg*	93	64	78.2	2.70
Tennessee.				
Ashwood*	98	60	79.0	3.60
Milan	93	54	70.9	0.72
Texas.				
Austin*	98	68	84.8	1.66
Brown, Fort	96	70	83.2	0.50
Clarksville*	97	62	81.2	2.41
Cleburne*	96	58	83.1	0.51
Comfort	.....	.....	.....	2.27
Concho, Fort	105	62	86.5	1.35
Corpus Christi*	92	79	85.3	.....
Corsicana	.....	.....	.....	0.25
Huntsville*	95	63	.....	1.86
New Ulm	86	78	83.0	0.09
Utah.				
Nephi*	96	47	68.9	2.65
Vermont.				
Brattleborough	89	37	65.9	6.34
Burlington	84	48	68.4	3.41
Charlotte*	88	47	65.0	5.90
Dorset	86	33	61.8	5.66
Lunenburg	82	30	61.4	5.77
Newport*	86	42	63.3	3.91
Post Mills Village*	89	35	61.1	.....
Stowe*	85	35.7	59.4	.....
Strafford	.....	.....	.....	6.90
Woodstock	87.8	34	63.0	8.48
Virginia.				
Accotink*	96	54	76.1	3.56
Bird's Nest*	96	59	79.9	7.05
Bruington	.....	.....	.....	5.14
Christiansburg	.....	.....	.....	1.56
Dale Enterprise*	95	48	77.0	3.09
Marion*	88	51	70.6	2.57
Monroe, Fort	93	62	77.8	1.31
Snowville*	88	40	.....	1.90
Summit	99	46	75.0	.....
Wytheville	87	40	70.0	3.70
Washington Territory.				
Bainbridge Island*	88	46	63.3	0.01
Kenewick	112	48	.....	.....
Pleasant Grove*	96	41	.....	.....
Tacoma*	84	52	64.5	0.00
Townsend, Fort	85	46	63	0.00
West Virginia.				
Helvetia*	92	39	67.2	3.14
Parkersburg	92	44	67.8	.....
Wellsburg	.....	.....	.....	7.45
Wisconsin.				
Beloit	86	44	65.1	9.23
Embarras*	82	54	64.5	5.15
Franklin	.....	.....	....	6.06
Madison	82	46	64.2	6.41
Manitowoc	84	41	64.4	4.62
Neillsville*	81	29	56.3	0.49
Prairie du Chien*	88	51	66.4	5.82
Wausau	80	36	60.7	3.29
Wyoming.				
Bridger, Fort	92	36	63.9	1.12
Fred Steele, Fort	92	33	63.0	1.43

NOTES AND EXTRACTS.

The following is an extract from the August, 1885, report of the "Dakota Weather Service" published in connection with the "Monthly Bulletin of the Commissioner of Immigration for Dakota," under the direction of Mr. Lauren Dunlap, of Huron:

The establishment of a monthly weather service for Dakota has been perfected by this office through the kind co-operation of Gen. W. B. Hazen, Chief Signal Officer, U. S. A., and it is believed that no feature of the bulletin will prove of greater value than the complete weather reports which will henceforth be published every month. * * *

Temperature.—Reports from the nine stations included in the Dakota Weather Service furnish an average mean temperature in Dakota for August of 60°.06, the highest mean (or average) being 66°, at Fort Bennett, and the lowest mean, 58°.3, at Saint Vincent. The highest temperatures during the month varied from 84°.6, on the 19th, at Deadwood, to 96°.7, on the 17th, at Fort Bennett. The lowest temperatures recorded varied from 47°.3, on the 25th, at Huron, to 27°.4, on the 24th, at Saint Vincent. The greatest daily range of temperature varied from 43°.3, on the 25th, at Moorhead, to 28°.3, on the 19th, at Yankton. The mean daily range of temperature varied from 18°.3, at Yankton, to 24°.8, at Fort Buford.

Rainfall.—The precipitation, or rainfall, is the most interesting feature of the weather reports, and has been so during the spring and summer. There has been a generous supply of rain, which generally fell when most wanted. The total precipitation recorded during August was as follows: Yankton, 6.21 inches; Deadwood, 2.92 inches; Huron, 3.89 inches; Fort Bennett, 5.87 inches; Bismarck, 1.62 inches; Fort Buford, 1.50 inches; Fort Totten, 1.91 inches; Moor-

head, 1.47 inches, and Saint Vincent, 0.95 inch. The average rainfall at the nine stations was 2.93 inches. The number of days on which rain fell varied from eighteen days at Deadwood to eight days at Bismarck. The average number of days on which rain fell at the nine stations was 12.3 days.

The following meteorological summary for August, 1885, for the state of Georgia, is taken from the "Crop Report," published under the direction of Hon. J. T. Henderson, Commissioner of Agriculture for Georgia:

Districts.	Temperature.			Average precipitation.
	Highest.	Lowest.	Monthly means.	
	°	°	°	*Inches.*
Northern Georgia	94	58	73.1	7.70
Middle Georgia	94	60	77.9	7.02
Southwest Georgia	96	66	80.5	6.57
East Georgia	92	62	78.4	6.70
Southeast Georgia	95	72	81.4	9.70
State	96	58	78.3	7.54

The following meteorological summary and accompanying remarks are from the August, 1885, report of the "Indiana Weather Service," under direction of Prof. H. A. Huston, of Purdue University, Lafayette:

Districts.	Temperature.			Precipitation.
	Highest.	Lowest.	Monthly mean.	
	°	°	°	*Inches.*
Northern counties	100.0	40	68.7	3.32
Central counties	95.1	41	69.2	5.06
Southern counties	100.0	50	73.4	4.04
State	100.0	40	70.4	4.14

The mean temperature of the state for August, 70°.4, is 1°.1 below that for August of last year, 3°.3 below the mean of fourteen years at Indianapolis, 2°.3 below the mean of twenty-nine years at Logansport, 5°.4 below the mean of twenty-one years at Vevay, 2°.1 below the mean of four years at Blue Lick, 0°.1 below the mean of four years at Worthington, and 4° below the mean of six years at Lafayette. The mean temperatures at the stations reporting comparisons is from 1° to 4° below the normal. The highest temperature occurred on the 1st and 9th; the lowest on the 15th and 26–28th.

The mean precipitation for the state, 4.14 inches, is 2.59 above that for last year, 0.88 above the mean of fourteen years at Indianapolis, 0.82 above the mean of twenty-nine years at Logansport, 1.00 above the mean of twenty-one years at Vevay, 0.59 above the mean of four years at Blue Lick, 1.30 above the mean of four years at Worthington, and 1.57 above the mean of six years at Lafayette.

Frosts were reported from three stations on the 15th, and from one station on the 28th.

The following meteorological summary and accompanying remarks are from the August 1885, report of the "Indiana Weather Service," under direction of Prof. W. H. Ragan, of De Pauw University, Greencastle:

Districts.	August, 1885.				Summer of 1885.			
	Temperature.			Precipitation.	Temperature.			Precipitation.
	Highest	Lowest.	Mean.		Highest.	Lowest.	Mean.	
	°	°	°	*Inches.*	°	°	°	*Inches.*
Northern counties	100	40	67.1	3.93	102	36	69.9	10.52
Central counties	95	41	69.2	5.64	99	36	70.9	13.47
Southern counties	97	45	72.8	4.75	99	46	73.8	10.90
State	100	40	69.7	4.77	102	36	71.5	12.30

Temperature.—The temperature averaged low, being 2°.0 below the average of twenty-nine years at Logansport; 2°.8 below thirty-two years at Spiceland; 3°.9 below fifteen years at Indianapolis; 1°.2 below twenty-one years at Vevay, and for the state, the same as in 1883, and 1°.2 lower than in 1884. The highest mean was 74°.9, at Degonia Springs; lowest, 62°.3, at Monticello; highest maximum, 100°, at Logansport; lowest minimum, 40°, at Monticello; state range, 60°; average station range, 43°.5; greatest, 55°, at Logansport; least, 36°, at North Liberty. The highest occurred at most stations on the 1st, in connection with a "low" central that morning far south and a "high" far north, and on the 9th, with "low" north and "high" west, and the lowest on the 15th, "high" north; 26th, northwest; 27th, north; 28th, east. For the summer the temperature was low, being 1°.4 below normal at Logansport; 3°.3 below at Spiceland; 4°.3 below at Indianapolis; 1°.4 below at Vevay; and the state 0°.7 higher than in 1883, and 0°.7 lower than in 1884. Highest station mean, 75°.3, at Sunman and Jeffersonville; lowest, 66°.5, at Fillmore; average range, 50°.7.

Precipitation.—Unevenly distributed through the month and over the state, ranging from 32.12 on the 2d, to none on the 5th, 10th, 15th, 16th, 17th, 26th, 28th, 30th, and from 8.83 at Fillmore to 2.08 at Jeffersonville. Rain, 23 days, none, 8. Fell mostly 1st to 9th, 13th, and 21st to 25th. By sections, the greatest amount fell in the centre, and least in the north. Thunder-storms occurred on the 1st, 2d, 3d, 4th, 6th, 7th, 8th, 9th, 12th, 13th, 18th, 19th, 21st, 22d, 23d, 24th, 25th, and frost is reported 15th and 28th. The great fall of the 2d occurred while the centre of the storm of that date was crossing the north end of the state, and was heaviest some distance south of the centre.

The following is the "Iowa Weather Bulletin" for August, 1885, prepared by Dr. Gustavus Hinrichs, director of the State Weather Service:

August, 1885, was cold and fair, with excess of rainfall, westerly winds prevailing.

The mean temperature of the month was 3° below the normal. The month of August has now for three years been nearly as cold, averaging 2°.75 below normal for 1883, 1884, and 1885. It was as cold in 1875 and 1859, and nearly twice as much below normal in the years 1856, 1849, 1842, and 1841. Instead of normally having but one such cold August in five years, we have now had three consecutive cold Augusts.

The first decade was nearly normal, the second was 2° below, and the third was 7° below its normal temperature.

The rainfall has been about fifty per cent. above normal, but the number of rainy days has been normal; farm work has therefore been interfered with but little, though heavy rains have done some damage. Very heavy rains have fallen on the 1st and 2d, 8th, 18th, 23d, and 24th, of which the last two rains were the most extended.

Hail storms have occurred on the 1st, 2d, 3d, 5th, and 17th in very limited portions of the state. Lightning has killed some stock, especially near wire fences. No whirlwind has occurred in Iowa, and our summer squalls have been very few and moderate in extent and intensity.

The early morning of the 26th was coldest in Iowa, but the temperature of the air remained well up in the forties.

The summer season now closed has again been cool, being one-half of a degree below normal.

The following is an extract from the August, 1885, report of the "Minnesota Weather Service," under direction of Prof. Wm. W. Payne, Northfield:

August, this year, takes precedence over all other terminal summer months, of which there is a record at any place in the state, for a low mean temperature; and also for low maximum and minimum temperatures, as well. This deficiency was general throughout all sections, and was chiefly caused by the continuous low temperature of the last thirteen days of the month, the mean for which was 8° to 11° below the normal. The highest temperature occurred during the first half of the month, at various dates, and the warmest days were the 6th, 7th, 8th, 10th, 11th, 16th, and 17th. The highest temperatures 91°.5, at any station, was observed at Moorhead, on the 7th; the lowest maximum, 81°.3, occurred at Duluth, on the 10th. The lowest temperature reported was 27°.4, at Saint Vincent, on the 24th. From the 18th to the end of month northerly winds prevailed, the nights were cold, and frosts, more or less injurious, were general, except in the southwestern part of the state, and near Lake Superior. Late crops and tender vegetation were damaged north of the forty-sixth parallel by the heavy frosts of the 23d, 24th, and 25th. The observer at Saint Vincent, Kittson county, in the extreme northwest, under date of the 24th says: "The frost of this date did considerable damage to all the crops; it being estimated that at least one-half of the wheat crop in this section is ruined." The observer at Park Rapids, Hubbard county, under date of the 25th says: "The temperature during the night fell to 28°.3, and all tender vegetation is killed." In the southeastern part of the state frost was general on the early morning of the 26th, but not sufficiently severe as to cause serious injury. The observers at Morris, Stevens county, Bird Island, Benville county, Duluth, Saint Louis county, and La Crosse, Wisconsin, report no frost during the month.

The rainfall for August was marked by a general deficiency, except in the extreme south and southeast. There was an average of less than 2 inches for the month west of a line drawn from Aitkin, on the Northern Pacific railway, to Mankato, in Blue Earth county, and from Mankato to Sherburne, Martin county. Less than one inch fell at Mankato (.90), Bird Island (.90), and Saint Vincent (.95). The largest rainfall at any station was measured at Northfield, 4.16 inches, and Albert Lea, 4.70 inches. The heaviest rains were on the 5th, 6th, 8th, 10th, 11th, 20th, and in the west and north on the 27th, when a steady, cold rain fell, of twenty-four hours duration. Rains of over one inch in twenty-four hours occurred, as follows: Northfield, 7th, 1.11 inches, and 11th, 2.70 inches, in four hours; Dodge Centre, 8th, 1.00 inch, and 11th, 1.65 inches; Albert Lea, 8th, 1.86 inches, 11th, 1.62 inches; Red Wing, 8th, 1.12 inches.

The following is an extract from the August, 1885, report of the "Missouri Weather Service," under direction of Prof. Francis E. Nipher, Saint Louis:

The mean temperature for the month has been, approximately, 2° below the normal at the central station. The observers throughout the state generally report the mean below the normal for August. The highest temperatures were observed during the first decade of the month. The maximum was observed on the 8th. The lowest minimum was observed on the 26th, at Saint Louis.

The rainfall in some parts of the state was much above the normal and in others below. At Saint Louis the probable mean was about the normal, which is 4.05 inches.

The following are taken from the assistants' reports:

Chamois: the mean temperature has been 1°.89 below the normal for August, taken from observations for the past twelve years, with an excess of rainfall 4.01 inches above the normal, taken from observations for the past six years. We have had a fine season for crops of all kinds, corn is extra; oats, hay, and vegetables good, and a luxuriant growth of grass for grazing purposes all over the country. Graham: heavy losses sustained in Nodaway, Holt, and Andrew counties in crops, especially corn, and property, by the overflow of the Nodaway River on the 27th. The corn crop in this vicinity is good—fully up to an average crop, notwithstanding the loss by high water. Meteors were seen on the 2d and 7th. Grass is growing finely since the rain; wheat seeding has commenced. Lamont: our corn crop is about made; have had all the rain we need so far. If we have no early frost our corn crop is insured; wheat seeding is progressing, although we will sow only about 50 per cent. of what was put in last year. Houstonia: quite a cool August; corn prospects rather flattering; preparations for wheat above the average; apple yield medium; peach crop a failure. Savannah: the past month has been a very remarkably dry one. On the 1st, 22d, and 29th we had a mere sprinkle, the consequence is that water is very scarce; the ground is so dry that farmers are not plowing at all. With all the drouth we have had, our corn is very good and continues green and growing. Wheat was poor, averaging eight to ten bushels per acre; oats very good—places making eighty bushels per acre; fruit is scarce, not half a crop; potatoes good, but some rotting in the ground. We are having some grasshoppers; they are depositing eggs; there have been some flying.

Prof. B. F. Thomas, of the Ohio State University, Columbus, director of the "Ohio Meteorological Bureau," forwards the following meteorological summary in advance of the regular monthly report:

Atmospheric pressure.—Mean for the state, as determined from observations at eleven stations, 29.97 inches; station reporting highest monthly mean, New Bremen, 30.02 inches; station reporting lowest monthly mean, Oberlin, 29.89 inches; station reporting highest observed reading, Wauseon, 30.30 inches, on the 27th; station reporting lowest observed reading, McConnellsville, 29.40 inches, on the 3d; monthly range for the state, .90 inch; station reporting greatest monthly range, Wauseon, .84 inch; station reporting least monthly range, Hanging Rock, .60 inch.

Temperature.—Mean for the state, as determined from observations at twenty-three stations, 69°.1; station reporting highest monthly mean, Pomeroy, 74°.8; station reporting lowest monthly mean, Wauseon, 65°.8; station reporting highest observed reading, Pomeroy, 98°, on the 1st; station reporting lowest observed reading, Quaker City, 40°, on the 27th; monthly range for the state, 58°; station reporting greatest monthly range, Levering, 55°.5; station reporting least monthly range, Oberlin, 40°; greatest daily range, 42°, at Oberlin, on the 21st; least daily range, 5°.5, at Cleveland, on the 23d.

Relative humidity.—Mean for the state, as determined from observations at twenty-one stations, 79.4 per cent.; station reporting highest monthly mean, Youngstown, 85.4 per cent.; station reporting lowest monthly mean, Cincinnati, 71.2 per cent.

Precipitation.—Average for the state, as determined from observations at twenty-four stations, 6.26 inches; station reporting largest monthly amount, Quaker City, 9.86 inches; station reporting least monthly amount, New Bremen, 2.74 inches.

Winds.—Of twenty-four stations reporting prevailing wind-directions, six report the most frequent directions from the north; five, from northeast; one, from east; two, from southeast; two, from south; five, from southwest; one, from west; and two, from northwest.

The "Daily Telegraph" of September 3, 1885, published at Saint Johns, New Brunswick, contained the meteorological summary for August, 1885, given below. It was furnished that paper by Mr. Gilbert Murdock, and was compiled from observations made at the city observatory:

Atmospheric pressure.—(Barometer one hundred and forty feet above mean sea-level, corrected to 32° Fahr.) Highest, 30.083, on the 9th; lowest, 29.460, on the 14th; monthly range, 0.623; mean daily range, 0.142; mean daily range for August, 1884, 0.113; mean daily range for August for twenty-five years, 0.127; mean of readings at 8 a. m., 29.802; at 2 p. m., 29.781; 10 p. m., 29.778; mean of tri-daily readings, 27.787; mean of tri-daily readings for August, 1884, 29.877; mean of tri-daily readings for August for twenty-five years, 29.908. (The monthly mean pressure for August, 1884, and the normal for the period of twenty-five years are, apparently, reduced to sea-level.—C. S. O.)

Temperature.—Highest, 75°.0, 2d; lowest, 46°.0, 28th; monthly range, 29°.0; greatest daily range, 20°.0; least daily range, 2°.0; mean daily range, 11°.7; mean daily range for August, 1884, 10°.6; mean daily range for August for a period of twenty-five years, 11°.6; mean temperature of the warmest day, 65°.7, 5th; mean temperature of the coldest day, 53°.3, 28th; mean temperature for the month at 6 a. m., 55°.9; at 2 p. m., 64°.9, and at 10 p.m., 58°.3; mean of tri-daily readings, 59°.7; mean of tri-daily readings for August, 1884, 59.5; mean of tri-daily readings for August for a period of twenty-five years, 59.6; highest August temperature recorded since 1860 is 84°, in 1875, and the lowest, 44°, in 1862 and 1882, or an extreme range in twenty-five years, of 40°; the highest monthly mean of the tri-daily readings is 61°.83, in 1877, and the lowest, 57°.71, in 1862, making a difference of 4°.12 in the extreme means for the same month during the period of twenty-five years.

Aqueous vapor.—Highest, 0.706, on the 5th; lowest, 0.270, on the 28th; average (8 a. m., 2 and 10 p. m.), 0.460; average for August, 1884, 0.477; average for August for twenty-five years, 0.446.

Relative humidity.—Highest, 100.0 per cent., on numerous dates; lowest, 52.0 per cent., on the 16th; monthly mean (8 a. m., 2 and 10 p. m.), 86.2 per cent.; monthly mean for August, 1884, 89.7 per cent.; monthly mean for August for twenty-five years, 86.8 per cent.

Precipitation.—Rain fell between 6 a. m. and 6 p. m. on six days; rain fell between 6 p. m. and 6 a. m. on nine nights; total fall by day, 0.660; total fall by night, 1.660; total for month (in seventy and one-fourth hours), 2.320; total for August, 1884, 6.445; average August rainfall for twenty-five years, 3.686; the wettest August on record since 1860 was 1864, with a rainfall of 7.235, and the dryest was 1883, with a total rainfall of 0.830.

The following is an extract from the Tennessee "State Board of Health Bulletin" for August, 1885, prepared under the direction of J. D. Plunkett, M. D., president, State Board of Health, and furnished in advance of the regular report:

State summary.

Mean temperature, 75°.80; highest temperature, 102°, on the 9th, at Sailors Rest; lowest temperature, 50°, on the 15th, at Sailors Rest, and on the 27th, at Hohenwald; range of temperature, 52°; mean monthly range of temperature, 36°.14; greatest monthly range of temperature, 52°, at Sailors Rest; least monthly range of temperature, 24°, at Greensville; mean daily range of temperature, 16°.5; greatest daily range of temperature, 39°, on the 17th, at Sailors Rest; least daily range of temperature, 2°, on the 18th, at Manchester, and on the 28th, at Careyville; mean maximum temperature, 94°.53; mean minimum temperature, 58°.40.

Mean depth of rainfall, 2.30 inches; mean daily rainfall, .074 inch; greatest rainfall, 6.21 inches, at Careyville; least rainfall, 0.03 inch, at McKenzie; greatest local daily rainfall, 2.80 inches, on the 12th, at Ashwood; days of greatest rainfall, 2d, 10th, 13th; day of greatest rainfall, 2d.

Average number of days on which rain fell, 6.7; average number of clear days, 11; average number of fair days, 13; average number of cloudy days, 7; rainless day, 29th; days of highest temperature, 9th, 10th; days of lowest temperature, 15th, 27th.

Prevailing wind, southwest.

The meteorological features for August, 1885, were the small amount of precipitation and the high temperature during the first half of the month.

There was the usual amount of electric disturbance, but no very severe storms were reported, except the small cyclone in the vicinity of Milan, which, happily, was not attended with any loss of life.

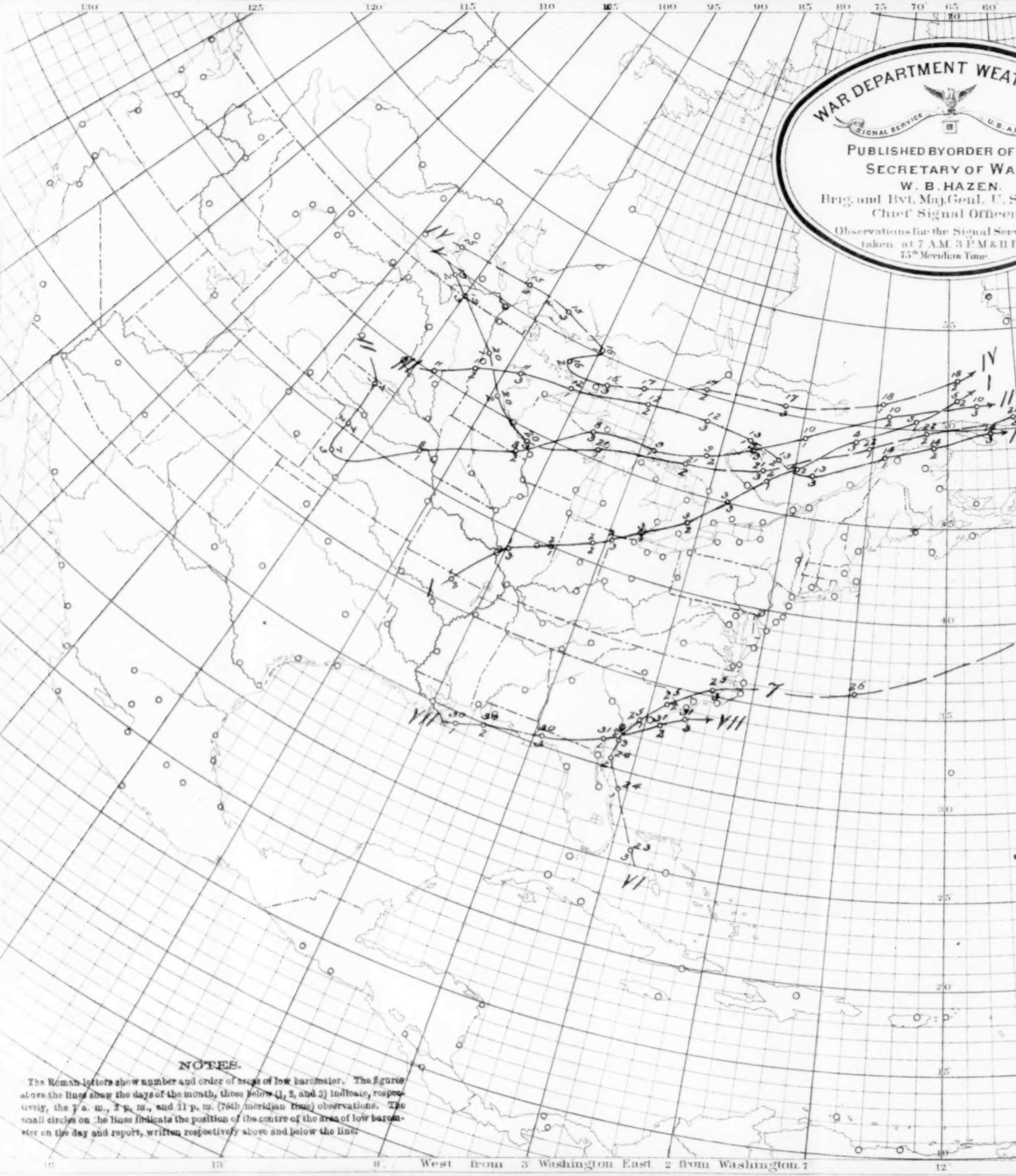
The mean temperature for the month was 75°.80, 2°.20 above the mean for the corresponding month last year, and 3°.80 above that for August, 1883.

The mean of the maximum temperature was 94°.53, 0°.71 above that for August, 1884, and the mean minimum temperature was 58°.40, 1°.40 above that for last August. The highest temperature of the first half of the month was a continuation, with scarcely a cessation or interruption, of the hot wave of the last decade of July, and for the intensity and duration was almost without a parallel.

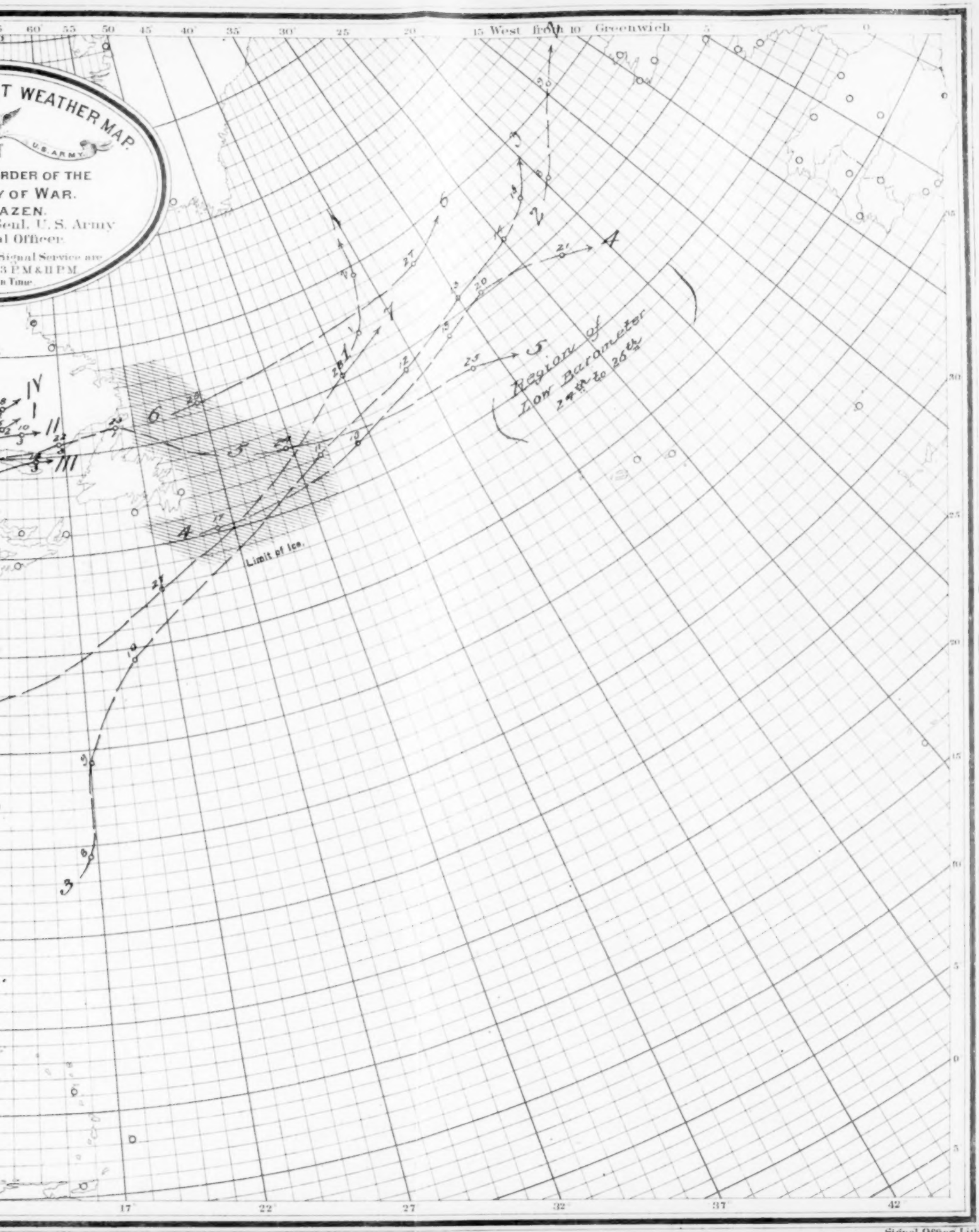
The average precipitation for the month was 2.30 inches less than the month previous, and only .22 inch more than for last August, which was below the normal. The distribution was very unequal, by far the larger portion being in the eastern division, 3.91 inches, while the middle and western divisions received only 1.88 and 1.12 inches, respectively. The rains of the 2d, 10th, 13th, and 25th were general, but heaviest in the eastern and middle divisions. Those of the 1st and 2d were the only ones of any note in the western division. From the 13th to the close of the month the rainfall was very light throughout the state, with, perhaps, two or three local exceptions in the eastern division, much of it being inappreciable. At Grief, on the 25th, a fall of 1.31 inches was reported, and was the greatest local daily fall after the above date. The days of the greatest rainfall were the 2d, 10th, 13th, the greatest of these being the 2d, on which day an average of a little more than half an inch of rain fell throughout the state. The greatest rainfall during the month was 6.21 inches, at Careyville, in the eastern division, and the greatest local daily rainfall was at Ashwood, in the middle division, on the 12th, when 2.80 inches of rain fell in the space of two hours and a half.

It is a little singular that with so little rain, the reports show only one rainless day during the month, the 29th. The average number of days on which rain fell, was 6.7, almost the same as last August, which was 6.1 days.

Chart I. Tracks of Cyclonic A


WAR DEPARTMENT WEA
SIGNAL SERVICE
U.S. A
PUBLISHED BY ORDER OF
SECRETARY OF WA
W. B. HAZEN.
Brig. and Bvt. Maj. Genl. U. S
Chief Signal Officer
Observations for the Signal Serv
taken at 7 A.M. 3 P.M. & 11
75th Meridian Time
NOTES.
The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month, those below (1, 2, and 3) indicate, respectively, the 7 a. m., 3 p. m., and 11 p. m. (75th meridian time) observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.
West from 3 Washington East 2 from Washington.

onic Areas, August, 1885.


T WEATHER MAP.
U.S. ARMY.
RDER OF THE
Y OF WAR.
AZEN.
Genl. U. S. Army
al Officer.
Signal Service are
3 P.M & 11 P.M.
n Time
Limit of Ice.
Region of Low Barometer 24th to 26th
West from 10 Greenwich
60 55 50 45 40 35 30 25 20 15 10 5 0
17 22 27 32 37 42

Signal Office Lith

Chart II. Isobars, Isotherms, and Winds, August, 1885.

Form 106 F

Form 106 P

Chart II. Isobars, Isotherms, and Winds. August, 1885.

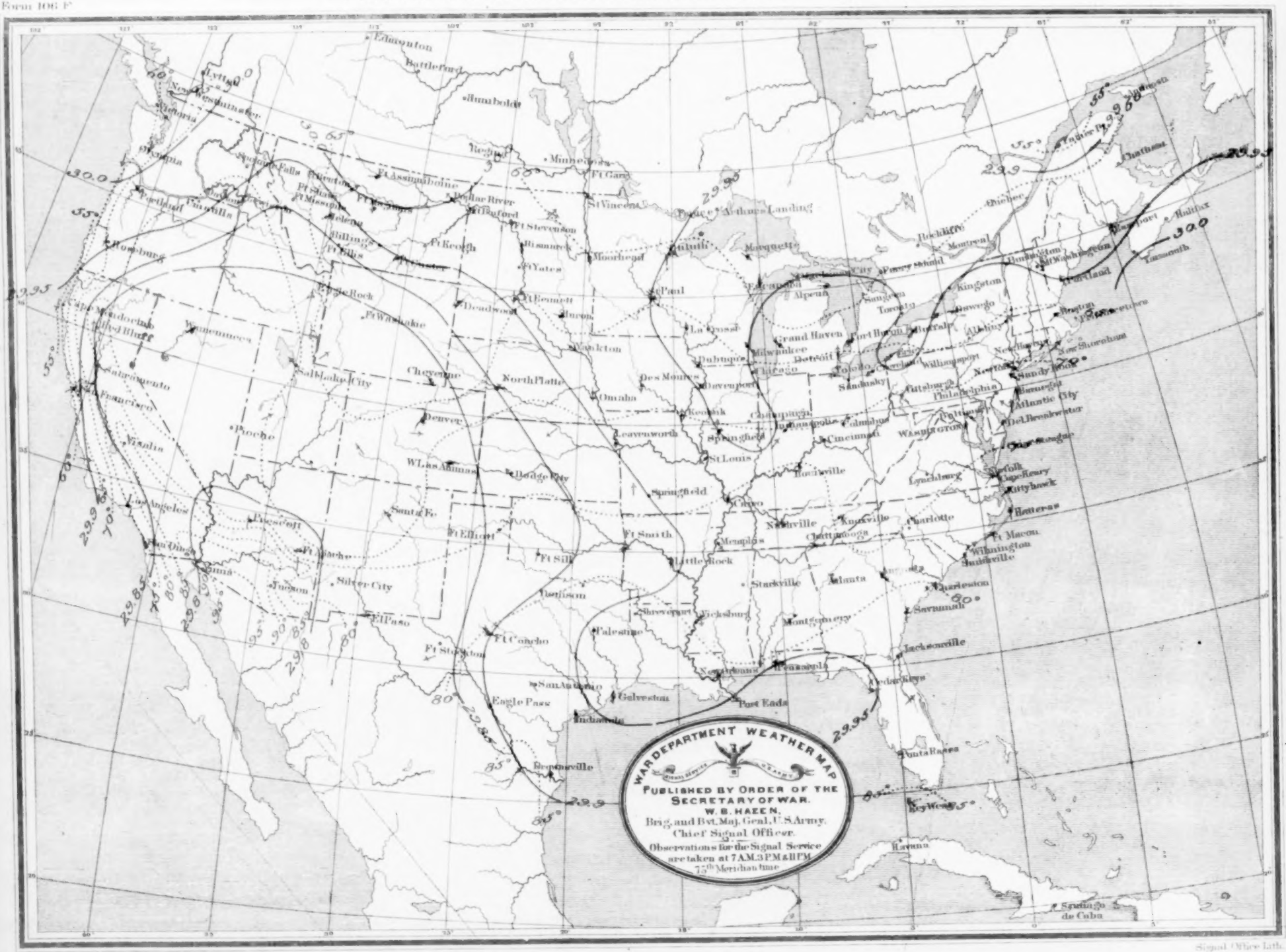
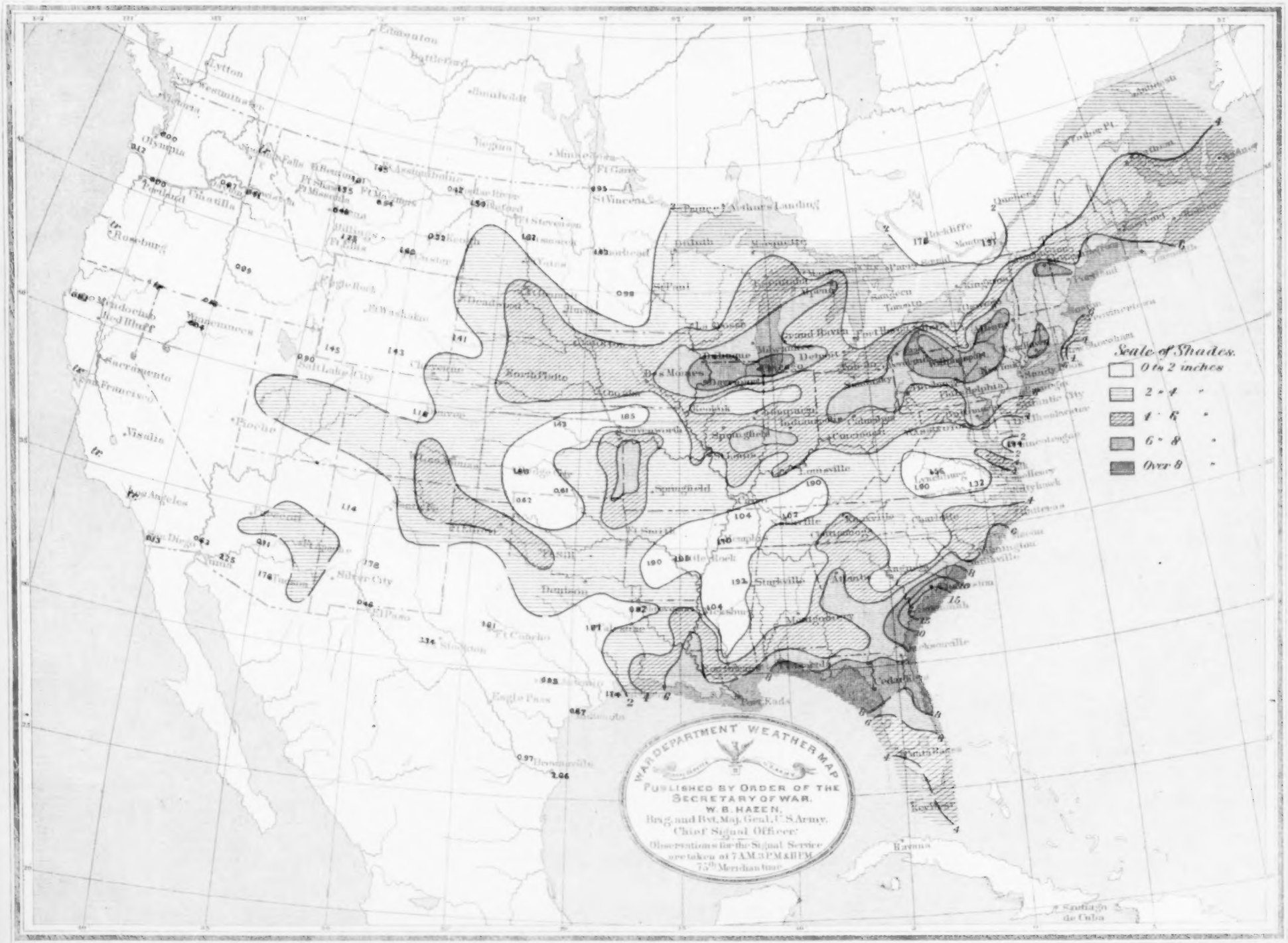

WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. B. HAZEN,
Brig. and Bvt. Maj. Genl. U.S.Army,
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M. 75th Meridian time
Edmonton
Battleford
Humboldt
Qu'Appelle
Winnipeg
Minnedosa
Ft Assiniboine
Ft Custer
Ft Stevenson
Bismarck
Moorhead
Ft Yates
Ft Keogh
Ft Ellis
Ft Custer
Ft Benton
Helena
Billings
Ft Missoula
Ft Shaw
Ft Assiniboine
Ft Buford
Milk River
Ft Stevenson
Ft Keogh
Ft Yates
Ft Bennett
Deadwood
Ft Wadsworth
Yankton
Pembina
St Vincent
Prince Arthurs Landing
Duluth
Marquette
St Paul
La Crosse
Dubuque
Des Moines
Omaha
North Platte
Cheyenne
Salt Lake City
Denver
Leavenworth
Kansas
Springfield
St Louis
Cairo
Ft Smith
Memphis
Little Rock
Ft Sill
Ft Elliott
Ft Bascom
Ft Concho
Ft Stockton
Ft Davis
Ft Bliss
El Paso
Ft Apache
Ft Grant
Ft Lowell
Ft Huachuca
Ft Whipple
Ft Mojave
Prescott
Silver City
Tucson
Yuma
Los Angeles
San Diego
San Francisco
Sacramento
Red Bluff
Roseburg
Portland
Walla Walla
Wadsworth
Winnemucca
Salt Lake City
Cheyenne
North Platte
Omaha
Des Moines
Davenport
Dubuque
La Crosse
St Paul
Moorhead
Yankton
Deadwood
Ft Bennett
Ft Wadsworth
Ft Yates
Bismarck
Ft Keogh
Ft Custer
Ft Ellis
Billings
Helena
Ft Benton
Ft Shaw
Ft Missoula
Ft Assiniboine
Milk River
Ft Buford
Ft Stevenson
Duluth
Marquette
Prince Arthurs Landing
Port Arthur
Halifax
Father Point
Quebec
Montreal
Rockliffe
Ottawa
Kingston
Toronto
Alpena
Grand Haven
Milwaukee
Chicago
Detroit
Port Huron
Buffalo
Oswego
Albany
Boston
New Haven
New Shoreham
Portland
Eastport
Calais
Dalhousie
Sydney
Yarmouth
Sandusky
Cleveland
Toledo
Williamsport
Pittsburg
Philadelphia
Harrisburg
Atlantic City
Delaware Breakwater
Washington
Baltimore
Cincinnati
Columbus
Indianapolis
Springfield
Peoria
Keokuk
Leavenworth
Kansas
St Louis
Cairo
Louisville
Nashville
Knoxville
Charlotte
Lynchburg
Norfolk
Cape Henry
Hatteras
Chattanooga
Memphis
Little Rock
Ft Smith

Chart III. Precipitation, August, 1885.

Form 106 F

Chart III. Precipitation, August, 1885.

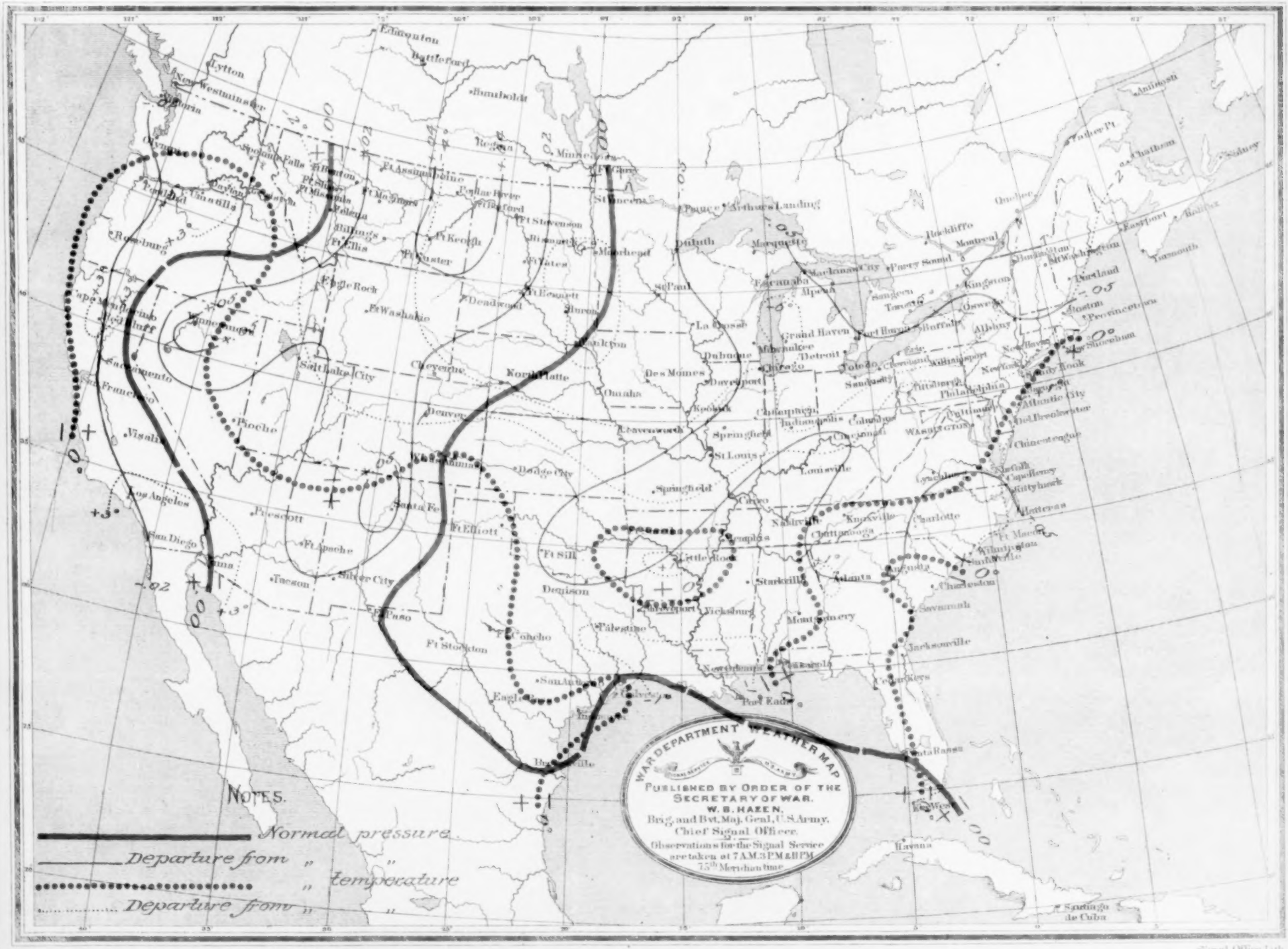

Scale of Shades.
0 to 2 inches
2 " 4 "
4 " 6 "
6 " 8 "
Over 8 "
WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. B. HAZEN,
Brig. and Bvt. Maj. Genl. U.S. Army,
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M. 75th Meridian time.

Signal Office Lith.

Chart IV. Departures from Normal Atmospheric Pressure and Temperature. August, 1885.

Form 106 F

Chart IV. Departures from Normal Atmospheric Pressure and Temperature. August, 1885.


WAR DEPARTMENT WEATHER MAP
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W. B. HAZEN,
Brig. and Bvt. Maj. Genl, U.S.Army,
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M. 75th Meridian time.
NOTES.
Normal pressure.
Departure from " "
" Temperature
Departure from " "

Signal Office Lith.

Voluntary observers of the Signal Service, on land, from whom meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for August, 1885.

Observer and place of observation.

Anderson, Dr. W. W., Stateburg, S. C.
Altaffer, J. M., Independence, Kans.
Adams, Dr. O. H., Vineland, N. J.
Abbott, Dr. E. K., Salinas, Cal.
Arents, Hiram, Oroville, Cal.
Avery, O. H., Oskaloosa, Iowa.
Achillion, R., Clear Lake, Ark.
Bisbee, Capt. Lewis, Buckfield, Me.
Blake, J. H., Christmas Prairie, Cal.
Bowman, P., Savannah, Ohio.
Ballou, Dr. N. E., Sandwick, Ill.
Boynton, John F., Syracuse, N. Y.
Bayerly, J. F., Spartanburg, S. C.
Bennett, Geo. Bandon, Oreg.
Beloit College, Beloit, Wis.
Bell, Joseph, Franklin, Pa.
Brainerd, Dr. H. G., Independence, Iowa.
Baker, Dr. Henry B., Lansing, Mich.
Beall, Dr. R. L., Lenoir, N. C.
Brendel, Dr. Fred., Peoria, Ill.
Bentley, David, Princeton, Cal.
Bartlett, E. B., Vermillion, N. Y.
Baldwin, A. L., Bethel, Conn.
Bardsley, Jas. G., Nephi, Utah.
Briggs, John, Albany, Oreg.
Betts, Prof. Arthur, Webster, Dak.
Breed, J. E., Embarras, Wis.
Baker, Dr. L. J., Ottumwa, Iowa.
Boies, Lieut. A. H., Hudson, Mich.
Boyd, Joseph, Oskaloosa, Iowa.
Beebe, A., Manistique, Mich.
Blachly, C. P., Manhattan, Kans.
Barney, Wm., Stowe, Vt.
Beecher, Chas., Wysox, Pa.
Charbonnier, Prof. L. H., Athens, Ga.
Cook, S. A., Milledgeville, Ga.
Cotton, Dr. D. B., Portsmouth, Ohio.
Clark, A. C., Wausau, Wis.
Casey, Geo., Auburn, N. Y.
Crawford, E. A., Liberty Hill, La.
Curtiss, G. G., Fallston, Md.
Cornell University, Ithaca, N. Y.
Cutting, Dr. Hiram A., Lunenburg, Vt.
Crosier, Adam, Laconia, Ind.
Caulkins, John S., Thornville, Mich.
Clark, T. A., Weldon, N. C.
Chandler, Dr. W. J., South Orange, N. J.
Cass, John J., Allison, Kans.
Clark, S. E., Clarksville, Tex.
Cocke, A. R., Indianola, Iowa.
Culver, G. E., Vermillion, Dak.
Carter, Rev. Dr. W. H., Tallahassee, Fla.
Comstock, Prof. F. M., Le Roy, N. Y.
Cochran, Wm. P., Clay Centre, Kans.
Carpenter, Dr. W. B., Leavenworth, K.
Christ, Jacob, Franklin, Wis.
Cheney, Wm., Minneapolis, Minn.
Caffee, Wm. K., Carthage, Mo.
Cooper, Dr. Geo. C., Manatee, Fla.
Corbin, F. E., Dudley, Mass.
Chubbs, Thos H., Post Mills, Vt.
Cole, Seward, Cahuenga, Cal.
Cutler, B. B., Heath, Mass.
Chapin, Adams, Poway, Cal.
Childs, W. H., Brattleborough, Vt.
Davis, Jacob, Rowe, Mass.
Dickinson, Jas. B., Guttenberg, Iowa.
Deming, H. D., Wellsborough, Pa.
Dozier, Wm., Mattoon, Ill.
Dewhurst, Rev. E., Voluntown, Conn.
Dunlap, W. L., Tecumseh, Nebr.
Day, Theodore, Dyberry, Pa.
Dawson, Wm., Spiceland, Ind.
Dunton, Lieut. W. R., Dorset, Vt.
Davenport, C. B., North Stamford, Conn.
Dow, Roswell, Sycamore, Ill.

Observer and place of observation.

Dudley, C. B. Altoona, Pa.
Doton, Hosea, Woodstock, Vt.
Dunlap, J. B., Charleston, Ill.
Dechant, Wm. H., Mahanoy Plane, Pa.
David, V. E., Buchanan, Mich.
Eliason, W. A., Statesville, N. C.
Elliott, Rev. J. C., Swanwick, Ill.
Eckstein, Rev. M., Conception, Mo.
Ellis, John, Marquette, Nebr.
Ellsworth, W. W., Hartford, Conn.
Everett, Dr. J. T., Clyde, Ohio.
Ewell, Dr. M. D., South Evanston, Ill.
Fernald, Prof. M. C., Orono, Me.
Ferris, B. F., Sunman, Ind.
Fouch, Dr. A., College City, Cal.
Fuller, E. N., Tacoma, Wash. T.
Fox., F. E., Fall Brook, Cal.
Fox, G. W., Murrieta, Cal.
Friend, Chas. W., Carson City, Nev.
Failyer, Prof. G. H., Manhattan, Kans.
Fleming, J., Readington, N. J.
Field, Thos. G., Parkersburg, W. Va.
Ferguson, W., Paterson, N. J.
Gates, W. B., Burlington, Vt.
Grathwohl, John, Blooming Grove, Pa.
Gillingham, Milnor, Fallsington, Pa.
Gardiner, R. H., Gardiner, Me.
Gowey, H. D., North Lewisburg, Ohio.
Gibson, John H., Salina, Kans.
Green, Dr. Jesse C., West Chester, Pa.
Gerrish, S. H., Sacramento, Cal.
Gray, J. W., Stockham, Nebr.
Gibbs, Geo. J. Grand Turk Id., B. W. I.
Goodwin, Wm., North Colebrook, Conn.
Gray, F. R., Yates Centre, Kans.
Gillingham, W., Accotink, Va.
Garlick, Rev. Dr. J. R., Bruington, Va.
Gray, Capt. A. W., Kenewick, Wash. T.
Heath, E. R., Wyandotte, Kans.
Horn, Dr. H. B., Atchison, Kans.
Hiram College, Hiram, Ohio.
Harvard College Observatory, Cambridge, Mass.
Hammitt, John W., College Hill, Ohio.
Heaton, Isaac E., Fremont, Nebr.
Helm, Thos. B., Logansport, Ind
Hoskinson, R. M., Bainbridge Island, Wash Ter.
Hyde, G. A., Cleveland, Ohio.
Hutchinson, J. C., Monmouth, Ill.
Hunter, Dr. T. C., Napoleon, Ohio.
Haywood, John, Westerville, Ohio.
Hassler, B. K., Chambersburg, Pa.
Hartzler, J. A., Mottville, Mich.
Hall, J. B., Worcester, Mass.
Hager, Mrs. L. G., Terre Haute, Ind.
Howe, Prof. J. L., Richmond, Ky.
Hoyt, F. C., Easton, Pa.
Houghton Farm Experiment Station, Mountainville, N. Y.
Heatwole, L. J., Dale Enterprise, Va.
Heacock, J. L., Quakertown, Pa.
Hamilton, W. H., Corsicana, Texas.
Hatch, A. H., Windsor, Ill.
Harris, W. C., Dover, N. J.
Hickman, E. A., Independence, Mo.
Hodge, Rev., F. B., Wilkesbarre, Pa.
Housekeeper, H. S., S. Bethlehem, Pa.
Humphrey, Dr. L., Fairbury, Nebr.
Hurlin, Rev. Wm., Antrim, N. H.
Harris, T. C., Raleigh, N. C.
James, John W., Marengo, Ill.
Jones, Dr. E. U., Taunton, Mass.
Jackson Company, Nashua, N. H.
Jordan, Dr. M. D. L., Milan, Tenn.
Jones, Ira B., Neillsville, Wis.

Observer and place of observation.

King, L. M., Santa Rosa, Cal.
Knapp, J. G., Limona, Fla.
Keese, G. Pomeroy, Cooperstown, N. Y.
Kuhne, F. W., Fort Wayne, Ind.
Keeler, W. F., Mayport, Fla.
Kirkwood, E., Mauzy, Ind.
King, W. R., Yellow Springs, Ohio.
Kent, Miss E., Phillipsburg, N. J.
Lueps, Miss Anna, Manitowoc, Wis.
Lincoln, A. T., Marion, Va.
Loomis, J. C., Jeffersonville, Ind.
Lay, Dr. F. H., Pueblo, Colo.
Lucas, Dr. G. L., Albion, Idaho.
Luther, S. M., Garrettsville, Ohio.
Ladshaw, Geo. E., Pacolet, S. C.
Lovewell, Prof. J. T., Topeka, Kans.
Lamb, Miss Bertha E., Sterling, Kans.
McGill College, Montreal, Canada.
McDonogh Institute, McDonogh, Md.
McCready, Miss L. A., Fort Madison, Iowa.
Moore, C. R., Bird's Nest, Va.
Munn, A. M., Kalamazoo, Mich.
Metcalf, Dr. John G., Mendon, Mass.
McKenzie, Dr. M., Centreville, Mo.
Memminger, E. R., Flat Rock, N. C.
Mallory, Miss H. B., Corpus Christi, Tex.
Macrae, Colin, Kirkwood, S. C.
Meehan, Thos., Germantown, Pa.
Moore, Nathan, Grampian Hills, Pa.
Mikesell, Thos., Wauseon, Ohio.
McClintock, F., West Union, Iowa.
Marshall, G., Cresco, Iowa.
Mitchell, Dr. D. W., Harrisville, Mich.
Miller, H. D., Drifton, Pa.
Moore, Dr. J. W., Easton, Pa.
Neal, Dr. J. S., Archer, Fla.
Newbegin, John D., Anna, Ill.
Newcomb, G. S., Westborough, Mass.
Noll, A. B., Somerville, N. J.
Nordberg, A., Richardton, Dak.
Nelson, P. P., Northport, Mich.
Norcom, Prof. T. J., Reidsville, N. C.
Osborn, Dr. Thos. C., Cleburne, Tex.
Olds, H. D., Cedar Rapids, Iowa.
Owsley, Dr. J. B., Jacksonborough, O.
Parker, D., Humboldt, Iowa.
Pearce, Thomas, Eola, Oreg.
Parrish, Geo. W., Ellensburg, Wash. T.
Patterson, Wm., Salem, N. J.
Partrick, J. M., North Volney, N. Y.
Purdue University, La Fayette, Ind.
Pettersén, Dr. F., Comfort, Tex.
Pritchett, Prof. H. C., Huntsville, Tex.
Remington, C. V. S., Fall River, Mass.
Robertson, T. D., Rockford, Ill.
Rogers, F. M., Luling, La.
Renfrew, H. N., Wilton Center, Ill.
Rodman, Thos. R., New Bedford, Mass.
Rotch, A. L., Blue Hill, Mass.
Russell, Geo. W., Wellsburg, W. Va.
Runge, C., New Ulm, Tex.
Rerick, A. H., LaGrange, Ind.
Richardson, C. F., Beverly, N. J.
Shaw, J., Rochester, Minn.
Shriver, E. T., Cumberland, Md.
Seltz, Chas., De Soto, Nebr.
Scott, Thos. G., Forsyth, Ga.
Stucky, Dr. C. T., Helvetia, W. Va.
Stern, Jacob T., Logan, Iowa.
Slade, Elisha, Somerset, Mass.
Slenker, Mrs. E. D., Snowville, Va.
Scribner, H. F. J., Strafford, Vt.
Sargent, J. B., Leicester, Mass.
Strong, S. B., Setauket, N. Y.
Shriver, Howard, Wytheville, Va.

Observer and place of observation.

Samostz, Oscar, Austin, Tex.
Shahan, Chas. C., Columbus, Nebr.
Shepard, E. M., Springfield, Mo.
Smith, H. D., Monticello, Iowa.
Safford, A. T., Williamstown, Mass.
Sherman, W. B., Manchester, Iowa.
Smith, Rev. D. W., Troy, Pa.
Staudenmayer, Dr. L. R., Lincolnton, N. C.
Snell, Miss S. C., Amherst, Mass.
Shaw, E., Maud, Kans.
Sim, John R., Summit, Va.
Sadler, Prof. H. E., Emporia, Kans.
Spilman, J. J., Pierce City, Mo.
Stone, W. E., Amherst, Mass.
Swezey, Prof. G. D., Crete, Nebr.
Sullivan, J. F., Braddock, Colo.
Sacred Heart College, Prairie du Chien, Wis.
Trembley, Dr. J. B., Oakland, Cal.
Todd, Prof. David P., Amherst, Mass.
Teele, Rev. A. K., Milton, Mass.
Truman, Geo. S., Genoa, Nebr.
Turnbo, Silas C., Pro Tem, Mo.
Tillinghast, C. B., Albany, N. Y.
Turner, Ernest, Point Pleasant, La.
Tyrrel, A. C., Madison, Nebr.
Thompson, R. J., Tiffin, Ohio.
Treimer, George, Round Grove, Iowa.
Voegeli, Adolphus, Des Moines, Iowa.
Washburne Observatory, Madison, Wis.
Wild, Rev. E. P., Newport, Vt.
Williams, Rev. C. F., Ashwood, Tenn.
Wing, Miss M. E., Charlotte, Vt.
West, Silas, Cornish, Me.
Wylie, Wm., Mount Forest, Canada.
Walton, J. P., Muscatine, Iowa.
Wait, S. E., Traverse City, Mich.
Woodstock College, Woodstock, Md.
Wolfe, John H., Wellington, Kans.
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Willis, O. R., A. M., Ph. D., White Plains, N. Y.
Watters, Dr. Jas., Westmoreland, Kan.
Went, E. C., Frankfort, Ky.
Williams, Dr. A. C., Elk Falls, Kans.
Wigg, Dr. Geo., East Portland, Oreg.
Woods, Mrs. Dr. A. G., Maynard, Iowa.
Wetmore, E. L., Tucson, Ariz.
Wright, J. W. A., Greensborough, Ala.
Whitmore, J. E., Gallinas Spring, N. Mex.
Wistrom, M. F., Harvard, Nebr.
Wadsworth, Dr. J. L. R., Collinsville, Ill.
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Walters, H. D., Christiansburg, Va.
White, Rev. J. H., Merritt's Island, Fla.
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Ward, J. B., Guilford, Ind.
Whitney, Chas. E., Humphrey, N. Y.
Whittington, G., Mount Ida, Ark.
Yetter, Wm. G., Catawissa, Pa.
Yates, T. P., Factoryville, N. Y.
Young, Geo. R., Penn Yan, N. Y.
Zimmerman, F. C., Bunker Hill, Ill.

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Assinaboine, Fort, Mont.
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Benicia Barracks, Cal.
Bidwell, Fort, Cal.
Brady, Fort, Mich.
Bridger, Fort, Wyo.
Brown, Fort, Tex.
Buford, Fort, Dak.
Concho, Fort, Tex.
Columbus, Fort, N. Y.
David's Island, N. Y. H.
Ellis, Fort, Mont.
Fred Steele, Fort, Wyo.
Gaston, Fort, Cal.
Klamath, Fort, Oreg.
Keogh, Fort, Mont.
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Mason, Fort, Cal.
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McDermitt, Fort, Nev.
Monroe, Fort, Va.
McHenry, Fort, Md.
Mount Vernon B'k's, Ala.
Meade, Fort, Dak.
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Preble, Fort, Me.
Randall, Fort, Dak.
Robinson, Fort, Nebr.
Snelling, Fort, Minn.
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Sisseton, Fort, Dak.
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Totten, Fort, Dak.
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Union, Fort, N. Mex.
Wingate, Fort, N. Mex.
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State weather services from which meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for August, 1885.

Dakota Weather Service, under direction of Mr. Lauren Dunlap, Huron, Dakota.
Georgia State Weather Service, under direction of Hon. J. T. Henderson, Atlanta, Georgia.
Indiana State Weather Service, under direction of Prof. W. H. Ragan, Greencastle, Indiana.
Indiana State Weather Service, under direction of Prof. H. A. Huston, La Fayette, Indiana.
Iowa State Weather Service, under direction of Dr. Gustavus Hinrichs, Iowa City, Iowa.
Minnesota State Weather Service, under direction of Prof. W. W. Payne, Northfield, Minnesota.
Missouri State Weather Service, under direction of Prof. Francis E. Nipher, Saint Louis, Missouri.
Ohio State Weather Service, under direction of Prof. B. F. Thomas, of the Ohio State University, Columbus, Ohio.
Tennessee State Weather Service, under direction of J. D. Plunkett, M. D., Nashville, Tennessee.
Data have also been used from meteorological records of the Central Pacific and Southern Pacific railway companies.

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